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SAVE WITH

THE FOOD INDUSTRIES AND THE UNIVERSITIES LOOK AHEAD TOGETHER[1]

CHARLES GLEN KING, Ph.D.

Scientific Director, The Nutrition Foundation

THE Nutrition Foundation was formally organized about one year ago, primarily because a number of public-spirited leaders in the food industry recognized two basic facts: first, that the American food supply, though adequate in quantity, was not making its best contribution to public health; second, that both industry and the community at large would gain by supporting fundamental research and the advanced training of scientific personnel.

After four years of discussion and planning, an organizing committee finally hit upon a basis of procedure that won the enthusiastic support of 15 member firms. Karl T. Compton, president of Massachusetts Institute of Technology, who was selected to serve as chairman of the Board of Trustees, took an active part in developing final plans and selecting personnel for the organization.

The present economic trend, accentuated by the war, makes it unlikely that individuals will continue to accumulate enough money to endow research and education in our universities and hospitals as they have in the past. Neither will it be possible or desirable for the government to assume complete control over all education and research. Another problem that established research institutions must meet arises from the prospect of inflation and decreased income from invested funds. Hence there is a critical need for a plan whereby industry can contribute directly to the support of fundamental research and the training of personnel on a nationwide basis.

ORGANIZATION

The governing body of the Nutrition Foundation is the Board of Trustees, consisting of one representative of each member firm and a second group of men whose record in public life assures their sincere interest in the public service nature of the Foundation's program—university presidents, or men of comparable standing and qualifications.

There are several novel features in the organization: first, each member firm contributes on a 5-year basis; and each year they are invited to advance their pledge one year, so that research projects can be planned continuously on a 5-year basis. This is one of the strongest and most encouraging features because it provides a degree of stability that is essential both for planning our projects and for obtaining the cooperation of highly qualified men. In order to protect the independence and quality of the program, an independent Scientific Advisory Committee, representing widely different areas of research and educational background, has been given major responsibility for placing research grants and for developing long range plans. A second major committee, and a very important part of the organization, is the Food Industries Advisory Committee, consisting of one representative from each member firm (in most cases the director of research). This group provides a close liaison between the technical staffs of the member firms and the Foundation.

The central objective of the Nutrition Foundation's program is to build a background of scientific guidance by which our food supply can make its maximum contribution to human health. The approach is chiefly by means of fundamental or exploratory research, with some consideration of the parallel need for education and training. We like the definition: The science of nutrition is the science of food and its relation to life and health.

The goal of making it possible for every man, woman, and child in the world to have a food intake adequate for all physiological needs, proposed recently by such leaders as Dr. Frank Boudreau of the National Research Council and Sir John Orr, food adviser to the British government, is laudable as an ideal, and we hope to work with many other agencies toward that end. However, the solution of a problem of such magnitude will probably never be complete and will at least require many decades and perhaps centuries of peace and international cooperation; it will also depend upon many considerations in the realm of economics, sociology and government. As the world struggles toward such a goal, the role of the Nutrition Foundation is rather clearly defined as an attempt to secure the basic, factual information necessary for the success of any such effort—a far better understanding of life processes in general and the science of nutrition in particular. It is normal, however, for men in science to work with a sense of service for all mankind. The food industry, the government, the medical profession, dietitians, home economists, educational leaders, and all who are responsible for our general progress toward better health, need the kind of information that comes chiefly from our research laboratories. In similar degree, they will need the services of highly trained young men and women who must be equipped by our educational institutions.

For practical purposes, our program can be viewed under four headings: (1) purely exploratory or fundamental research; (2) nutrition studies related directly to human health; (3) education; and (4) war work, in the general area of foods and nutrition.

Subdivisions of this nature are not entirely satisfactory for a single research project may overlap all four fields; or a project that is classified as pure research one month may contribute to public health or the war emergency a few months later. One feature of the program should be emphasized; neither the trustees nor the committees want us to sponsor the type of work generally classified as food technology—in other words, processing and product research. Neither are we to engage in so-called "propaganda" or "sales promotion" types of activity. The individual firms all have their own research laboratories and sales promotion agencies. I mention this because many people have hastily concluded that we were interested chiefly in applied types of study, just because the Foundation is supported by industry. When the war is over we shall do more, rather than less, purely exploratory work. At present certain technological problems demand attention because of the war emergency.

The trustees felt that their objectives would be achieved more surely and with greater economy through a nationwide program of grants-in-aid to established research centers, rather than by means of a central research laboratory.

TYPES OF RESEARCH GRANTS

The following list of research grants will illustrate the type that is primarily exploratory or fundamental: the amino acid requirement of man; development of bioassays for vitamins and amino acids; biotin (vitamin H) metab-

[1] Excerpts from the annual Mary Swartz Rose Memorial Lecture, presented before the Greater New York Dietetic Association, February 17, 1943.

olism in man; the nutritional significance of biologically available methyl groups; synthesis and metabolism of nicotinic acid in the rat; and a quantitative study of nutrients in human milk.

Research projects that are less exploratory, but which have a more obvious bearing upon health, can be illustrated by the following: methods for detecting clinical vitamin deficiencies; relation of nutrition to dental caries in the monkey; relation of vitamin A intake to well-being at different ages; thiamin analysis and stability in cereal products; relation of nutrition to rheumatic fever and chemotherapy; and the influence of dietary factors on the healing of bone fractures.

There have been a number of cases where our support seemed to be necessary in order to get research related to the war under way quickly. As an immediate contribution to the nation's best interest the following projects directly related to the war emergency have been aided: nutrition and resistance to fatigue in normal man; effects of environment on nutrition and metabolism; conservation of nutritive values in dehydrated vegetables and meats; utilization of soybean proteins and minerals; availability of essential fatty acids in hydrogenated fats; and effects of large quantity cooking on the vitamin and mineral content of vegetables.

EDUCATION

In our plans for educational work, we feel that the research grants are in fact making a substantial contribution to the training of research personnel, because the greater part of our funds will be used for post-doctorate and graduate student fellowships. By making it possible for young people of special promise to receive research training in our better university centers, we are not only contributing to research in the sense of information obtained, but provision is being made for stronger leadership in the future, both in industry and in the universities.

We hope it will be possible to expand our work in the educational field to a moderate degree, as we get more funds. For example, there is a strong feeling that something can be done to improve the teaching of nutrition in our medical schools. We have not crystallized our plans in that direction but I believe we shall make definite progress during the year. We are also considering several suggestions for special fellowships, for example, to enable physicians, physiologists and dietitians to gain experience in research with experimental animals or in special medical centers.

Many of you are familiar with our publication *Nutrition Reviews*. When our committees first discussed educational work, all were agreed that there was need for some means of screening the wheat from the chaff in the current literature. Much that is published is woefully unsound, leading to confusion; and there has been a very wasteful delay in the general acceptance of good research work. After studying the problem for some time, we decided to undertake the publication of a small journal, specifically for the purpose of making available an unbiased, editorially interpreted review of the world's current research progress in the science of nutrition. Plans for the publication were worked out in collaboration with a special editorial advisory committee and later with the editorial staff (Dr. F. J. Stare, editor, and seven assistant editors). The response to the publication, as measured both by letters concerning its value and by paid subscriptions, has given convincing evidence of its service.

During its first year, the Foundation's membership has grown from the original 15, to 21 founder members, 11 sustaining members and 5 donors. Its program has included 54 grants made to 36 universities, totaling $168,000, and there is a good prospect that the activities, membership, and support will continue to grow. With such growth, the program can be developed until it more nearly meets the obvious need that lies ahead.

Mr. George A. Sloan, president of the Foundation, has expressed his view of the Nutrition Foundation's over-all program as follows: "In the recent establishment of this Foundation, the food industry has made an earnest effort to aid in the solution of problems which have arisen in the midst of a war emergency. It has done more than this. It has acknowledged a definite social responsibility and function in making further explorations into the science of nutrition for the betterment of mankind."

SUMMARY

The Nutrition Foundation, established in 1942, has begun to work toward the day when our food supply will make its greatest possible contribution to human health. As the program of the Foundation has grown, the necessity for keeping it balanced with respect to the over-all public need, which must include consideration of problems related to the war emergency, has been recognized. When peace returns there will be an increased emphasis upon fundamental research and education in the belief that these will contribute richly to better public health and to greater success in industry in the years ahead.

Syndromes Productive of Symphonies and Satire

We can trace Ménière's syndrome back to antiquity. One of the best medical writers of the twelfth century was a Benedictine abbess, later canonized Saint Hildegarde. She considered vertigo as being caused by a congested condition of the brain. "When headache and vertigo attack a patient simultaneously," she observes, "they render a man foolish and upset his reason." Martin Luther, while an Augustinian monk, suffered from attacks. During his career as a reformer occurred the scene in which he threw the inkwell at the devil who was roaring in his ears. Dean Swift, the great satirist, also was afflicted and carefully recorded his own symptoms. Never a pleasant man, he turned violently sour the latter part of his life because of the frequency of the attacks and lived in seclusion. Beethoven was afflicted with bilateral nerve deafness. It is probable that the rages to which that great man was subjected were brought on by attacks of Ménière's syndrome. The first movement of the fifth symphony is highly suggestive. It is a matter for conjecture—the effect on that great genius if he had had a bilateral resection of the auditory nerve performed. Our own Gamaliel Bradford, noted for his character studies, was also afflicted. He described vividly his symptoms as "the swoop of the hawk."—*Rainey, J. J.: Histamine in the Treatment of Ménière's Syndrome, J.A.M.A., 122: 850, 1943.*

BIOTIN, PANTOTHENIC ACID, AND RIBOFLAVIN BALANCES OF YOUNG WOMEN ON A MILK DIET[1]

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THE importance of milk in the normal human diet has been stressed for many years. Furthermore, certain therapeutic diets are largely restricted to milk. Although many studies have been made concerning the utilization of minerals in milk, few balances of the B-vitamins have been carried out with human subjects. Knott, Kleiger and Schlutz (1) have reported the thiamin metabolism of infants during the consumption of a milk diet. The present study concerns the biotin, pantothenic acid, and riboflavin contents of the urine and feces of human subjects when mineralized milk constituted the only food eaten.

EXPERIMENTAL

Three healthy young women were the subjects; their weights remained nearly constant during the experiment.

Diet. The diet consisted of three quarts of pasteurized grade A milk purchased on the open market. One quart was consumed at each meal. The following supplements were given daily: 50 mg. l-ascorbic acid and 5 ml. mineral mixture. The mineral mixture contained 8.5 gm. iron pyrophosphate, $Fe_4(P_2O_7)_3 \cdot 9H_2O$; 0.4 gm. copper sulfate, $CuSO_4 \cdot 5H_2O$; and 0.4 gm. manganese sulfate, $MnSO_4 \cdot 4H_2O$, in a pint of water. Caramel candy was allowed *ad lib.* to supplement the caloric intake. This milk diet provided very liberal amounts of the three B-vitamins studied.

Methods. The biotin, pantothenic acid, and riboflavin contents of the milk were determined directly on representative samples of the milk consumed. No treatment other than dilution was used.

Twenty-four-hour urinary collections were made in brown glass bottles containing 3 ml. glacial acetic acid and 1 ml. chloroform, and were preserved with a layer of toluene. The excreta for the first three days were discarded. Because of the difficulty of accurately separating feces for short periods, combined fecal collections were made for days 4 through 6, and 7 through 10, with the aid of carmine markers; also, aliquots of the 24-hour urinary collections representing the same periods were composited. Each fecal elimination was collected directly in an acid-alcohol mixture containing 2 per cent glacial acetic acid (2) in order to prevent further bacterial activity. The samples were then fan-dried at 43 to 50°C. for 24 to 48 hours, ground and bottled in brown glass.

Biotin contents of urine and feces were determined essentially by the yeast growth method of Snell, Eakin and Williams (3), pantothenic acid by the microbiological assay of Strong, Feeney and Earle (4), and riboflavin by the microbiological assay of Strong and Carpenter (5). All values for biotin were based on at least four different assays in which the results agreed within 10 per cent. The figures for pantothenic acid and riboflavin are the averages of duplicate determinations.

RESULTS AND DISCUSSION

The biotin, pantothenic acid, and riboflavin contents of the urine and feces of three subjects consuming the mineralized milk diet are shown in Table 1.

Biotin. The urinary biotin ranged from 40.0 to 57.7 μg. daily (average 49.5 μg.) or 35 to 50 per cent (average 43 per cent) of the dietary intake of biotin. Forty-three per cent of the biotin from the milk was accounted for in the urine. This level of urinary biotin is slightly lower than that found when a similar amount of biotin from beef liver or from biotin methyl ester was ingested (69.5 and 77.6 μg. respectively) and is higher than that found when boiled yeast (7½ cakes containing 27 μg. biotin) was eaten daily. (*See* Parsons, Collord, Gardner, Strong and Peterson (6) and unpublished data.)

TABLE 1

Biotin, pantothenic acid, and riboflavin balances during a mineralized milk diet

VITAMIN	SUBJECT	DAYS	DAILY DIETARY INTAKE	DAILY ELIMINATION		
				Urine	Feces	Total
			μg.	μg.	μg.	μg.
Biotin	J. C.	4–6	115.0	45.0	88.2	133.2
		7–10	"	48.2	67.6	115.8
"	J. G.	4–6	"	52.8	81.0	133.8
		7–10	"	57.7	99.6	157.3
"	M. I.	4–6	"	40.0		
		7–10	"	53.5	30.6	84.1
	Av.			49.5	73.4	122.9*
			mg.	mg.	mg.	mg.
Pantothenic acid	J. C.	4–6	6.9	6.7	0.24	6.94
		7–10	"	5.6	0.22	5.82
"	J. G.	4–6	"	6.2	0.80	7.00
		7–10	"	4.8	0.58	5.38
"	M. I.	4–6	"	6.5		
		7–10	"	6.1	0.21	6.31
	Av.			6.0	0.41	6.41*
			mg.	mg.	mg.	mg.
Riboflavin	J. C.	4–6	7.0	3.4	0.44	3.84
		7–10	"	3.6	0.38	3.98
"	J. G.	4–6	"	3.5	0.58	4.08
		7–10	"	3.3	0.54	3.84
"	M. I.	4–6	"	3.1		
		7–10	"	3.2	0.17	3.37
	Av.			3.4	0.42	3.82*

* Since one fecal sample is missing, this figure is obtained by adding the average urine and fecal values.

Considerable difficulty in defecation was experienced due to the constipating nature of the diet. Part of one fecal sample of Subject M. I. was unavoidably lost. The fecal biotin, pantothenic acid, and riboflavin values in the remaining sample for this subject were much lower than for the other two subjects. The fecal material remained much longer in the intestinal tract of M. I. than for the other subjects, the first two markers taking from 1½ to 4 times as long to appear. This may have had a direct bearing on the low levels of these B-vitamins in the feces of M. I. The fecal biotin for the three subjects varied from 30.6 to 99.6 μg. daily (average 73.4 μg.) or 27 to 87 per cent (average 64 per cent) of the dietary intake.

[1] This study was supported, in part, by a grant from The Nutrition Foundation, Inc. Received for publication, July 19, 1943.

The total biotin output was 73 to 137 per cent (average 107 per cent) of the intake. A small amount of biotin synthesis was indicated for two of the three subjects (J. C. and J. G.).

Pantothenic Acid. The urinary pantothenic acid varied from 4.8 to 6.7 mg. per day (average 6.0 mg.) or from 70 to 97 per cent (average 87 per cent) of the dietary intake. Thus, the urinary pantothenic acid nearly equaled the intake. For all three subjects the pantothenic acid in the urine was less during days 7 through 10 than during days 4 through 6. This difference probably indicates only the variation that occurs between successive periods.

The fecal pantothenic acid was very low, amounting to 0.21 to 0.80 mg. (average 0.41 mg.) daily, which was equivalent to a very small percentage of the dietary pantothenic acid (range 1.5 to 12.0 per cent, average 6 per cent).

The total output, fecal and urinary, of pantothenic acid was slightly less than the intake (range 5.38 to 7.00 mg. daily, or 78 to 102 per cent; average 6.41 mg. daily, or 93 per cent of the intake). Thus, almost all of the dietary pantothenic acid was accounted for in the excreta. Either there was little or no destruction of pantothenic acid in its course through the body or synthesis by micro-organisms in the intestinal tract compensated for the destruction by the tissues.

Riboflavin. For the two periods of the diet the urinary riboflavin was very constant for the three subjects (range 3.1 to 3.6 mg. daily, average 3.4 mg.) and accounted for about one-half of the calculated dietary intake.

The fecal riboflavin was of the same order of magnitude as the fecal pantothenic acid; only a small amount was found and this represented only 6 per cent of the intake (range 0.17 to 0.58 mg. daily, average 0.42 mg.). It is noteworthy that the riboflavin and pantothenic acid contents of the feces were very low, in contrast to the figures for biotin. If, in the total riboflavin output, one includes the value of the fecal content which probably arises mainly from bacterial synthesis, the total output accounts for only about 55 per cent of that ingested. These data would, therefore, indicate a considerable destruction of riboflavin by body processes.

SUMMARY

The biotin, pantothenic acid, and riboflavin contents of excreta for three healthy young women consuming a mineralized milk diet have been presented. The diet supplied liberal amounts of these vitamins. The daily biotin, pantothenic acid, and riboflavin contents of the urines averaged 0.0495, 6.0 and 3.4 mg., respectively; that for the feces, 0.0734, 0.41 and 0.42 mg., in the same respective order.

The total biotin in the excreta was divided about equally between the urine and feces. A small excess of output over intake was observed in two of three subjects.

The urinary pantothenic acid and riboflavin accounted for most of these vitamins eliminated; only about 6 per cent of pantothenic acid and 11 per cent of riboflavin eliminated was found in the feces. The total output of pantothenic acid almost equaled the intake but only about 55 per cent of the ingested riboflavin was accounted for in the excreta.

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Life and Biotin

Last October a group of biochemists headed by Dr. Vincent du Vigneaud succeeded in picturing the structure of the complex biotin molecule—a performance akin to but far more difficult than drawing the plans of a house. With the blueprint of Dr. du Vigneaud to aid them, chemists of the Merck laboratories have now built the molecular house called biotin. The Gradgrinds naturally ask: What of it? An achievement of higher importance to human well-being can hardly be imagined. For biotin, one of the "B" vitamins, is essential to growth. Nothing from a germ to man can live without it.

Now that biotin has been synthesized the cost comes down and the research biochemist is able to study effects without wondering whether they may not be attributed to some unknown factor. All this is particularly important in the study of cancer; for without biotin tumors will not grow. There is also the question of evolution. The evidence is strong that the hormones played their part in the development of new species. But what of the vitamins? Drs. C. C. Gordon and J. H. Sang of Aberdeen University recently showed that overdoses of niacin, another "B" vitamin, will cause fruitflies born without feelers and antennae to produce normal progeny, though these in turn bring forth the original defective strain. Here we have proof that diet and evolution are in some way related. A vitamin like biotin, which is necessary for growth, may well prove to be equally important in tipping the scale of embryonic life one way or the other.

We have in the study of biotin another example of the power of the scientific method. What began as an algebraic "X" in food ends as a chemical with a formula, a definite compound that can be made at will in the laboratory. Castles in the clouds are brought down to earth, and man roams through their many rooms, discovering in each new wonders that enable him to preserve his health, prolong his life and possibly control his evolutionary destiny.—*Editorial, The New York Times, May 30, 1943.*

THE ESSENTIAL AMINO ACIDS IN HUMAN NUTRITION[1]

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It is only within recent years that the role of amino acids in human nutrition has been subjected to intensive study. Practically all of the earlier investigations with humans in this field have been concerned simply with an estimation of the total protein requirement (1). Sherman's value of 1 gm. protein per kilo body weight per day (2) is most frequently quoted as sufficient to provide a margin of safety of 50 to 100 per cent as far as requirements are concerned. This level of dietary protein consumption is based upon acceptable balance studies with human beings in which nitrogen equilibrium was established at a low level of protein intake.

The need for proportionately larger amounts of protein in diets of growing children and in pregnant and lactating women is clearly recognized. Recently the Food and Nutrition Board of the National Research Council suggested in the interests of national health that specific quantities of protein be allowed per individual depending upon the degree of maturity, sex and physiological state (Table 1).

TABLE 1

The protein requirement per day for optimal nutrition according to the standards recommended by the National Research Council

	gm.
Man (70 kg.)	70
Woman (56 kg.)	60
Pregnancy (latter half)	85
Lactation	100
Children—up to 12 years	
Under 1 year (per kg. body wt.)	3 to 4
1-3 years	40
4-6 "	50
7-9 "	60
10-12 "	70
Children—over 12 years	
Girls—13-15 years	80
16-20 "	75
Boys—13-15 years	85
16-20 "	100

SIGNIFICANCE OF THE ESSENTIAL AMINO ACIDS

Under optimal conditions dietary protein is derived from a wide variety of foods of both animal and vegetable origin. If the selection of foods is restricted because of economic limitations or conditions due to a general emergency (blockade, rationing, etc.), care must be exercised in the proper choice of protein. The chief consideration here is the essential amino acid composition of the protein mixture. Animal proteins have a greater biological value than those of vegetable origin due to the fact that they contain a greater number of the essential amino acids in quantities significant from the nutritional standpoint. The notable exception is gelatin, derived from collagen; its poor biological value is attributed to the absence or low content of certain of the essential amino acids (3).

The nutritive significance of the amino acids has been studied extensively by Rose and his associates, and these and earlier studies by other investigators have been summarized (4). These investigations, carried out on the rat, have indicated which amino acids are dispensable and which essential for that organism (Table 2).

[1] Received for publication, July 9, 1943.

In 1929 Thomas (5) summarized the unsolved problems in protein nutrition as: (a) which amino acids must be present in the diet; (b) how much do we require of each; and (c) what are their specific roles. Lewis states (1), "Today after more than a decade of intense interest and research in protein metabolism these questions still epitomize the problem of the role of proteins in nutrition. When they can be answered exactly the role of protein in the diet will be known and one will be able to determine the dietary value of every mixture of proteins in natural foodstuffs."

Some attempts have been made to determine the specific functions of the essential amino acids, that is, other than for the construction of new tissue. Methionine is a precursor of cystine, found in relatively high concentration in the protein of epidermal structures and also of certain hormones, particularly insulin. Twelve per cent of the insulin protein is cystine, while no methionine is present (7, 8). Methionine also furnishes methyl groups for the synthesis of choline, a dietary essential, and creatine, which functions in the maintenance of muscular activity (9). Phenylalanine is believed to furnish the nucleus for the formation of two hormones, thyroxine and epinephrine (1). Histidine may be the precursor of histamine in the body (10). Arginine probably furnishes the amidine group for the synthesis of creatine (11). Specific biochemical functions for the other essential amino acids have not as yet been suggested.

TABLE 2

Classification of the amino acids

INDISPENSABLE	DISPENSABLE
Lysine	Glycine
Tryptophane	Alanine
Histidine	Serine
Phenylalanine	Norleucine
Leucine	Aspartic acid
Isoleucine	Glutamic acid
Threonine	Hydroxyglutamic acid
Methionine	Proline
Valine	Hydroxyproline
Arginine*	Citrulline
	Tyrosine**
	Cystine**

* Arginine can be synthesized by the animal organism, but not at a sufficiently rapid rate to meet the demands of normal growth.

** These amino acids, while not essential, may be important in nutrition, since they may replace methionine and phenylalanine to a limited extent (4, 6).

Generally speaking, the amino acids may be utilized in one of three chemical processes in the organism: (a) condensation with other amino acids to form protein characteristic of a particular tissue; (b) utilization of the amino acids for some special purpose other than general synthesis of cellular protein (*e.g.* synthesis of the blood proteins, of the protein moiety of enzymes, of the proteins with hormonal function, etc.); and (c) deamination of the amino acid and utilization of the non-nitrogenous portion for caloric purposes. Obviously the essential amino acids are of particular importance in the first two categories. However, if protein constitutes an unusually large fraction of the diet, the excess essential amino acids are utilized for caloric purposes just as readily as the dispensable amino acids.

Recently, the quality of amino acid mixtures, either in intact protein molecules or as hydrolysates, has been

evaluated in a number of conditions which have been attributed to inadequate protein intake. Those which respond to amino acid therapy and which are more frequently associated with malnutrition, are reviewed under the following subdivisions of this paper.

THE ROLE OF THE ESSENTIAL AMINO ACIDS FOR GENERAL TISSUE PROTEIN SYNTHESIS

Comparative studies of the value of various proteins and amino acid mixtures for general tissue protein anabolism (synthesis) have been conducted on man and experimental animals by measurement of the dietary intake and the urinary and fecal excretion of nitrogen. When the dietary protein intake is inadequate quantitatively or qualitatively (*i.e.* furnishing insignificant quantities of the essential amino acids), the nitrogen excreted is in excess of that ingested. This condition of negative nitrogen balance represents a loss of tissue protein from the organism. When the reverse is true, such as is observed in the growing child or in the pregnant or lactating woman, evidence of tissue protein synthesis is apparent from the positive nitrogen balance (that is, the nitrogen excreted is less than that consumed). In the normal adult the nitrogen intake is generally equal to that excreted and the individual is then said to be in nitrogen equilibrium. When an excess of protein is ingested by such an individual, nitrogen equilibrium is soon reestablished but at a higher level of excretion. This is due to the inability of the animal organism to store an appreciable quantity of protein or amino acids. The excess protein, therefore, is metabolized simply for caloric purposes.

The method used by the pioneer workers in evaluating different protein sources consisted in determining the level of protein necessary to maintain nitrogen equilibrium in previously fasting animals. The hypothesis was advanced that the efficiency of a protein for this purpose was dependent upon its chemical similarity to the tissues of the organism being fed (12, 13). For example, Zisterer (13) has listed values for the relative amounts of different protein materials required to replace nitrogen loss in the dog as follows:

Dog Flesh	Horse Flesh	Casein	Edestin	Gliadin
100	108	128	153	163

Support for this hypothesis was derived from a study of nitrogen, sulfur, and phosphorus balances by Wolf (14) who observed a greater absorption when dog flesh, in contrast to ox-heart, was fed to a dog. Further confirmatory evidence was offered by Busquet (15) and Billard (16) who reported that frogs and tadpoles thrive better when fed tissues of the same species. The studies of Frank and Schittenhelm (17) and von Hoesslin and Lesser (18), however, were not in agreement with the above hypothesis.

In 1909 Thomas (19) conducted nitrogen balance studies on himself and concluded that animal and milk proteins were two to three times more valuable than cereal proteins in adult nutrition. It is pertinent to point out that these studies were conducted before it was determined (4) which amino acids are essential and how they are distributed in foods. Block (3) has shown by chemical analyses that animal and milk proteins are superior to cereal proteins as sources of the essential amino acids. The present concensus is that the essential amino acid composition of a protein, rather than its source, determines its nutritional value.

In extensive nitrogen balance studies conducted on the rat, Mitchell and co-workers (20) obtained numerical measures of the protein values of various foods, *i.e.* that proportion of the absorbed nitrogen which escaped excretion in the urine. Some representative biological values are: whole egg protein, 94; whole milk protein, 85; animal tissue protein, 72; white flour protein, 52; navy bean protein, 38.

Melnick and Cowgill (21) estimated the minimal quantity of a given protein necessary for the attainment of nitrogen equilibrium by the dog as follows:

Protein	Protein Minima for Nitrogen Equilibrium*	Relative Biological Value
Lactalbumin	6.9	100
Serum protein	8.6	80
Casein	9.4	73
Gliadin	21.1	33

* Expressed in terms of the per cent of total ingested calories furnished by the protein in the diet.

Compared with lactalbumin, fully three times as much gliadin (which contains only a small percentage of the essential amino acid, lysine) had to be fed before nitrogen equilibrium was attained. The amino acid composition (3) of lactalbumin makes it one of the most nutritious of the proteins.

More recently, Holt and associates (22–25) have determined human amino acid requirements by direct observations on man rather than by inferences based on animal experiments. A casein hydrolysate lacking one essential amino acid at a time was fed to determine the effect of this mixture on the nitrogen balance, followed by a study of the effect when the missing amino acid was restored to the mixture. Nitrogen equilibrium could not be maintained if tryptophane (22), lysine (23), methionine or cystine (24) were absent from the diet. This was not true for arginine, a deficiency of which, however, caused a decrease in the spermatozoa count and cessation of their motility (25). This observation is of interest since the spermatozoa are characterized chemically by their high content of protamines (proteins yielding few amino acids other than the basic amino acids). Lysine deficiency in the female appeared to interfere with the menstrual cycle (23). Holt's studies are in agreement with those reported earlier on the rat (4) and constitute direct evidence that the human species probably requires the same amino acids essential for the rat.

Studies of Rose and associates (26, 27), now actively engaged in determining the role of the amino acids in human nutrition, are similar to those reported by Holt and collaborators in that the basic criterion for the evaluation is the influence of the absence or presence of a particular amino acid on maintenance of nitrogen equilibrium. The basic diets employed by the two groups of investigations, however, differ. Rather than employ a casein hydrolysate as the main source of dietary protein, Rose has used a ration furnishing 7 to 8 gm. nitrogen daily, of which 95 per cent is in the form of a mixture of the 10 essential amino acids shown to be indispensable for animals. The fact that nitrogen equilibrium was readily maintained by subjects subsisting on such a highly purified diet was considered as proof that the 12 amino acids previously shown to be dispensable for rats and dogs, are also dispensable for man. These investigators have demonstrated that valine, methionine, threonine, leucine, isoleucine, and phenylalanine are necessary constituents of the diet of man. Histidine, however, according to these investigators, is not necessary for the maintenance of nitrogen equilibrium in the human adult.

Thus the work of Holt's and Rose's laboratories has established that 9 of the 10 amino acids essential for animals, are also indispensable for man. The results with histidine do not necessarily indicate that this compound is not an essential dietary factor for the human species.

The absence or presence of arginine in the diet also failed to influence appreciably the nitrogen balance, but this amino acid was observed to exert a significant action on spermatogenesis (25). Histidine, like arginine, may prove to be important for man in some specific metabolic or functional process.

The studies on the human in both Holt's and Rose's laboratories have as yet not yielded any specific information on the quantitative requirements for the essential amino acids. From the investigations on the dog by Melnick and Cowgill (21), in which the minima for nitrogen equilibrium of proteins of varying amino acid composition were determined, it may be inferred that the specific requirements for the essential amino acids will vary from individual to individual. Thus, many more subjects than the numbers now used by Holt and Rose will undoubtedly have to be employed before reliable values can be obtained. However, the number of subjects is of necessity restricted by the unpalatability and cost of the test dietaries. It seems, therefore, that the scheme proposed by Melnick and Cowgill might very well be used in human nitrogen balance studies. Two individuals on a given diet may differ as to their minimal requirement of a particular essential amino acid but may show a parallel consistency in their reactions to various levels of this amino acid in the dietary. In the case of the dog, the slopes relating responses to various critical levels of protein intake were found to be essentially parallel (21). Thus, feeding a given dog one of the proteins studied at a level productive of a slightly negative balance, followed by extrapolation of the response to the line of nitrogen equilibrium by drawing a line parallel to the mean curve obtained with the previous test animals, made it possible to estimate the protein minimum for the given dog from the data derived from only *one* nitrogen balance experiment. The balance should be slightly negative since any error, due to assuming the slope of the response curve for the test subject to be equal to the predicted mean slope, would be minimal. In addition to the many variables listed by Melnick and Cowgill for the proper control of the nitrogen balance studies, we must now add that some source of protein nitrogen other than the essential amino acids must also be supplied. Otherwise an appreciable fraction of the essential amino acids will be used simply as a source of the dispensable amino acids which must also participate in tissue protein anabolism. In the case of rations containing modified protein hydrolysates (22–25), the dispensable amino acids will of course be ingested along with the essential amino acids.

ROLE OF ESSENTIAL AMINO ACIDS IN THE FORMATION OF BLOOD PROTEINS

It is not possible at present to correlate specific deficiency symptoms with a suboptimal intake of certain of the essential amino acids. Malnutrition due to an inadequate protein intake is almost always associated clinically with vitamin and mineral deficiencies. Probably the most common and serious sign of chronic inadequate protein nutrition in man is the decrease in the concentration of the proteins in the blood serum.

The most important function of the serum proteins lies in their osmotic attraction for water. They are the most effective agents for maintaining fluid balance between the blood cells and plasma or between plasma and intercellular tissue spaces and serous cavities. The serum protein concentration in the normal individual is remarkably constant, ranging from 6.3 to 7.6 per cent (28). Excessive protein feeding (29) is apparently without effect in producing a hyperproteinemia (elevated serum protein concentration). Fasting (30–32) for limited periods has a negligible effect on the serum protein level.

Severe and chronic malnutrition, particularly with reference to the quality of protein intake, has been frequently reported as the etiologic agent in the production of a hypoproteinemia (low serum protein concentration) with associated edema. During and after World War I, nutritional edema was prevalent in famine areas. Lusk (33), Kohman (34), Maver (35) and more recently Weech (36) have reviewed the literature on edema related to dietary protein deficiency. All factors involved have been critically examined, and the disease has been attributed to protracted subsistence on a diet deficient in total calories and especially in proteins of good quality. High-fluid and high-salt intakes are contributory features. Hard work and exposure to cold are factors simply in that they effect a relative caloric deficiency when the food intake remains constant.

Denton and Kohman (37) experimentally produced edema in a large proportion of rats fed diets composed largely of carrots. Subsequently, Kohman (34) reported that rats, made edematous on a low-protein-carrot diet, were cured by the substitution of 18 per cent casein for 18 per cent cornstarch in the ration. This work was confirmed by Frisch, Mendel, and Peters (38) who also observed a low concentration of serum protein.

Bloomfield (39) failed to produce a significant hypoproteinemia in rats on a low-protein diet (3 per cent) for 21 weeks. Later (40), he was able to produce a decreased serum protein concentration and edema by employing a diet exclusively of carrots. A diet of dried carrot powder failed to produce hypoproteinemia or edema, whereas the forced addition of water by suspending the powder in agar reproduced all the effects of fresh carrot feeding. Water plus an inadequate protein intake, therefore, appeared to be the crucial factors rather than some specific constituent of carrots. In regard to correlating the carrot hypoproteinemia with clinical malnutritional disorders, Bloomfield (40) states "that a combination of factors is necessary in both cases; namely an inadequate total caloric intake, an ill-balanced diet, a defective protein ration and a large fluid intake. No one of these factors alone seems adequate to produce hypoproteinemia, at least with any constancy."

Shelburne and Egloff (41) have succeeded in producing hypoproteinemia in the dog by a diet low in protein, but adequate in carbohydrate and fat. Only after a solution of salt and water was administered by stomach-tube was a massive edema precipitated. Subsequently Weech and co-workers (42) reported the successful employment of a low-protein-carrot diet in the production of hypoproteinemia in the dog.

Experimentally produced edema with low-protein diets has also been reported in the monkey (43) and in man (44).

In all cases reported, both edema and hypoproteinemia disappeared when sufficient quantities of suitable proteins were administered.

It is necessary to emphasize that quality, rather than quantity of protein, is the important factor in preventing nutritional edema. An adult male subsisting on a low-caloric intake of approximately 2000 calories per day, two-thirds from cereal and one-third from vegetable sources, would actually consume each day about 70 gm. protein. This is confirmed by Robinson and associates (45) who studied the nutritional status of more than 500 subjects on a low economic level in an industrial suburb of Madrid during the summer of 1941. Bread, of chief importance in determining the caloric intake, frequently supplied more than one-half the total calories, with olive oil, potatoes, rice, and an occasional fresh vegetable as

the other mainstays of the diet. Animal protein, when available, was supplied almost entirely by fish, while meat, eggs and milk protein were practically unknown. Even so, the average protein intake per day was 66 gm. per adult male unit on an average intake of 1600 calories.

A protein intake of approximately 70 gm. per day is far in excess of the minimal protein requirement of man (2). However, inadequate protein diets, such as described above, are primarily responsible for the appearance of war edema in countries where dietary restrictions exist. Accordingly, nutritional hypoproteinemia and its accompanying edema must be attributed primarily to an inadequate intake of the essential amino acids. Quantity of protein is of importance only in the sense that consumption of a large excess of the foodstuff is instrumental in furnishing sufficient of those essential amino acids which are present in low concentration in the protein mixture.

Closely related to nutritional edema are those conditions of lowered assimilative ability or of protein wastage caused by infections or intoxications. Peters and his collaborators (46, 47) observed that in certain patients with tuberculosis, diabetes, or gastro-intestinal diseases associated with malnutrition, the concentration of the plasma proteins is reduced. Melnick and Cowgill (48) have critically reviewed experimental and clinical observations on factors productive of hypoproteinemia other than inadequate protein intake.

That dietary protein is effective in stimulating serum protein formation has been well established by investigations conducted at Rochester (49), Columbia (50) and Yale (51) Universities, which have been reviewed by Madden and Whipple (49). Two experimental procedures were used to produce hypoproteinemia: one involving the administration of an inadequate protein diet (50); the other the technique of plasmapheresis (49, 51) which involves bleeding of the test animal, followed by reinjection of blood cells suspended in saline or Locke's solution, the over-all effect being a specific depletion of plasma. In the latter procedure there is no generalized depletion of tissue protein such as occurs in the production of hypoproteinemia by restriction of dietary protein. The ingestion of a protein-free diet furnishing sufficient calories favored the more rapid development of a hypoproteinemia as compared to simple fasting (50–52). Thus starvation is able to mask to a great extent the objective signs of protein malnutrition, *viz.* hypoproteinemia and edema. Apparently when tissue protein catabolism is reduced by the ingestion of a protein-free diet, amino acids are not available from endogenous sources in sufficient quantity to cure or prevent the hypoproteinemia. This accounts for the so-called war edema observed most frequently in countries where the populace subsists on diets adequate with respect to calories but deficient in protein quality. In a blockaded country, therefore, nutritional hypoproteinemia may not be evident until the blockade is lifted and the dietary is "flooded," as has been the practice, with the cheapest and most abundant of foods, the cereal products (53).

That the essential amino acids *per se* are of great importance in the formation of the serum proteins is evident from the studies conducted when the sole source of dietary protein nitrogen is the incomplete protein, gelatin (50), or a mixture of the 10 essential amino acids (54). Gelatin was the least favorable of all in stimulating serum protein formation, while a mixture of the 10 crystalline amino acids was as effective as most dietary proteins for this purpose.

Closely related to the hypoproteinemia (and edema) produced by an inadequate protein diet is that associated with pregnancy and lactation. Peters and Van Slyke (28) have reviewed the literature pertaining to serum protein fluctuations during pregnancy. Plass and Bogert (55) believe that the sustained decrease in serum protein concentration during pregnancy is due simply to blood dilution or hydremia. Peters and Van Slyke (28), however, have attributed this to a specific disturbance in the mechanism which usually maintains the serum proteins at a constant level. In order to ascertain which interpretation was correct, an experimental study of the factors responsible for the hypoproteinemia during pregnancy and lactation was conducted by Melnick and Cowgill (56). Dogs subsisting on control standardized diets were subjected to plasmapheresis. Evidence of appreciable plasma hydration was obtained. However, the more important factor responsible for the hypoproteinemia was the decreased amount of reserve serum protein in the pregnant and lactating animal and the marked impairment of ability to regenerate serum protein. The synthesis of body proteins in the fetus during pregnancy and of the milk proteins during lactation was considered actually to be an internal plasmapheresis leading to a depletion of the serum protein by preferential utilization of the materials from which the complex is made.

This conclusion was supported by a study of severe cases of human nutritional edema during pregnancy by Arnell and Guerriero (57). Obviously, then, in conditions of pregnancy and lactation the consumption of a diet furnishing a sufficient quantity of protein, characterized by a high proportion of the essential amino acids, is indicated.

In conditions of inadequate protein intake the hemoglobin content of the blood may also be low. Fully 15 to 18 per cent of the blood is the protein, hemoglobin (28), and a variety of factors are essential for its proper formation. The dietary deficiencies responsible for anemias may be classified as: (a) those arising from a lack of substances concerned with the formation of hemoglobin—iron, copper and certain organic factors, particularly the essential amino acids; and (b) those having to do with the formation and development of the red corpuscles—the specific substances effective in curing pernicious anemia.

Whipple (58) and Minot (59) have reviewed the subject of hemoglobin regeneration as influenced by dietary factors. Even in the presence of adequate amounts of iron or copper or of the specific anti-pernicious anemia factor, hemoglobin formation is retarded unless an adequate quantity of protein is available. This has been confirmed by Weech and associates (60) who observed, during experimental production of edema in the dog by a low-protein diet, a decrease in both red blood cell count and hemoglobin concentration. Likewise, in studies on the rat, Pearson and collaborators (61) and Orten (62) demonstrated that complete proteins (*i.e.* with respect to their essential amino acid composition) are effective in the formation of hemoglobin when adequate quantities of copper and iron are administered. If an inadequate protein diet is consumed in the presence of sufficient quantities of copper and iron, hemoglobin regeneration occurs but at a slower rate. Apparently the missing essential amino acids are derived from body protein. If the diet is deficient in copper and iron, hemoglobin regeneration is retarded (63). Thus, an inadequate protein diet is efficacious in the formation of hemoglobin only when supplemented by the amino acids derived from body protein. In the poorly nourished individual the degree of this supplementary action is impaired and anemia results.

The other blood protein of importance, fibrinogen, is converted to fibrin in the clotting of blood. The fibrinogen concentration of plasma is approximately 0.28 per cent (64). Foster and Whipple (65) have reported that diets rich in animal protein (meat, liver, beef, heart) favor a high blood fibrin level, as contrasted with fasting or carbohydrate or fat feeding. According to Vars (66), this ef-

fect may be produced by any kind of protein, including casein, but the dietary stimulus to increased fibrinogen cannot be maintained indefinitely. Tissue injury and inflammation (67) are the most powerful single stimuli to over-production of fibrinogen. There appears to be no limit to tissue protein catabolism in supplying the amino acids for this purpose. Thus, the need for an adequate dietary supply of the essential amino acids for the formation of fibrinogen does not exist.

ADMINISTRATION OF AMINO ACID MIXTURES IN PLACE OF DIETARY PROTEIN

A recent application of the observations that an adequate mixture of the amino acids may replace protein in nutrition, is the clinical use of protein hydrolysates administered orally and parenterally.

Rose (4), as a fitting climax to his classic investigations on the amino acid requirements of the rat, was able to induce optimal growth with a diet furnishing only the 10 essential amino acids. The animals gained in weight just as rapidly as when all the constituents were supplied as preformed protein. This observation was truly remarkable, in view of the fact that the dietary mixture furnished only 11.2 per cent of the biologically active forms of the essential amino acids. These studies, as mentioned above, are now being extended to determine the role of the amino acids in human nutrition (26, 27).

The use of the crystalline amino acids as a substitute for dietary protein at present is not feasible. In general, they are difficult to prepare when obtained from natural sources and are synthesized only at a prohibitive cost. Furthermore, the synthetic amino acids are usually mixtures of equal parts of the *d-* and *l-* forms. Only the natural isomers of five of the amino acids—valine, leucine, isoleucine, lysine and threonine—promote growth. For these reasons crystalline amino acids have been used only in studies of an experimental nature. For practical purposes, protein hydrolysates prepared either by acid or enzymic digestion must be employed at present.

The intravenous injection of amino acids (enzymic hydrolysate of meat) over a considerable period was first demonstrated by Henriques and Anderson (68) as an effective means of administering protein nitrogen.

The studies of Cox and Mueller (69) were instrumental in promoting interest in the practical use of protein hydrolysates as dietary supplements. They showed that a purified casein digest prepared by pancreatic digestion was as satisfactory as the unhydrolyzed protein for promoting growth in rats and for the regeneration of serum protein in dogs. Subsequently, the same investigators (70) were able to develop a casein hydrolysate, containing 12.54 per cent nitrogen on the dry basis and free from antigenic complexes when tested on guinea-pigs. When injected into infants the solution produced mild temperature reactions but proved to be non-allergenic (71). The procedures for preparing their hydrolysates have been patented (72, 73).

The first patent (72) deals with the preparation of a purified protein hydrolysate (*e.g.* casein) by treatment with inorganic acid. The acid-precipitated casein is washed with acidified water until free from inorganic salts and then hydrolyzed with sulfuric acid under reflux. Barium hydroxide is added for neutralization of the acid, barium sulfate discarded, the neutralized hydrolysate clarified with activated carbon, concentrated *in vacuo*, treated again with barium hydroxide, and finally with hydrogen sulfide to precipitate heavy metals. The final solution is concentrated to dryness.

The second patent (73) deals with a digest prepared by enzymic action. Purified casein in a solution at *p*H 6 to 9 is digested with ground pancreas at 38°C. Fresh pancreatic tissue is added daily until the amino acid nitrogen is maximal and constant. The *p*H is adjusted to neutrality, the solution decolorized with activated carbon and the clear filtrate concentrated to dryness.

Studies using similar amino acid hydrolysates were carried out in a number of other laboratories. Elman (74) observed that the intravenous injection of the amino acids favored the formation of serum protein in dogs previously subjected to severe hemorrhage. Definite evidence of an increase in serum protein content was obtained within 6 hours. In the control animals no regeneration occurred in 6 hours and very little in 24 hours. Injected amino acids left the blood stream with great speed even after large intravenous doses (75). That retention of amino acids occurred was evident from a study of the nitrogen excretion (76, 77). Complete retention occurred whenever a balanced mixture of essential amino acids was injected; under these conditions immediate nitrogen balance was noted. When an incomplete mixture of amino acids was injected (tryptophane and cystine were omitted), only slight retention occurred and nitrogen balance was not achieved. If the missing essential amino acids were injected separately 8 hours after the injection of the basic mixture, nitrogen balance was not obtained. It seems, therefore, that retention and utilization of a mixture of amino acids require not only that all the essential amino acids be available but that all be present at the same time. Acid digests of protein must be supplemented with tryptophane, since this amino acid is destroyed during strong acid hydrolysis.

The concentration of amino acids in the blood normally is small (3 to 8 mg. amino nitrogen per 100 cc. blood), undoubtedly due to the rapidity with which the tissues remove these from the blood. Van Slyke and Meyer (78) have studied this subject extensively. For illustrative purposes, a typical experiment is described: 150 cc. of a casein hydrolysate containing 4.06 gm. amino nitrogen (approximately equivalent to 30 gm. amino acids) were injected into a fasting dog within 30 minutes. Of the amino acids injected, approximately 5 per cent remained in the circulation half an hour after the injection with only 11 per cent excreted in the urine. The remaining 84 per cent was absorbed by the tissues evenly throughout the body without undergoing any immediate change and subsequently used by the tissues for their own protein synthesis. These experiments indicate that it is almost impossible to flood the organism with an amino acid mixture so that large losses in the urine or excessive destruction *in vivo* occur. Thus, in conditions of parenteral alimentation, the rapid administration of an essential amino acid mixture by the intravenous route represents not only an effective but also an economical means of administering protein.

Subsequent studies by Elman and associates (79, 80) have confirmed his earlier experimental observations on the beneficial effects of intravenous injections of amino acids in correcting the hypoproteinemia produced by hemorrhage. However, in the case of hypoproteinemia produced by simple restriction of the dietary intake of protein the regeneration of serum protein was not very dramatic. Only about 3.5 per cent of the protein hydrolysate participated in the replacement of serum protein, the remainder being utilized to replenish tissue protein. These observations are not surprising since nutritional hypoproteinemia is associated with a general protein depletion of the organism, whereas the hypoproteinemia following hemorrhage is not. Thus, Whipple and his

group (81) observed that casein digests and solutions of the 10 essential amino acids (54) administered parenterally were very effective in forming blood plasma protein in dogs subjected to plasmapheresis.

Whipple's studies, however, were carried out on dogs normal in every respect except for the hypoproteinemia. The question thus remained whether an animal in shock could still utilize parenterally-administered amino acids for serum protein formation. Elman and Lischer (82) suggest that this is possible. In fatal surgical shock experimentally produced in dogs by repreated hemorrhage, immediate replacement with a protein hydrolysate exerted a definite therapeutic effect as shown by survival time, an increase in the degree of hemorrhage which could be tolerated, and a higher level of blood pressure. The controls received dextrose solution alone. The crystalline amino acids exerted a similar but less pronounced effect. This may be indicative of the desirability of terminating the protein hydrolysis during the preparation of a hydrolysate at a point when allergenic properties are no longer apparent, and not attempting to obtain maximal and constant formol titration values.

Studies from Whipple's laboratory have also shown that amino acid mixtures are favorable for hemoglobin formation (83). However, it was impossible to grade the individual amino acids as hematopoietic agents since the organism was able to furnish the balance of amino acids required for the hemoglobin molecule from the dietary protein, the protein stores, or from tissue protein catabolism.

Elman and Weiner (84) were the first investigators to administer intravenously a mixture of amino acids to humans. Experimental and clinical observations indicated that the injected amino acids were rapidly utilized as shown by prompt attainment of nitrogen balance, regeneration of serum protein and alleviation of the associated edema. These results on humans have been confirmed in the same laboratory (85) and elsewhere (86–90).

Successful nutrition of infants has been reported when the source of nitrogen in the diet consists of hydrolyzed casein (91). Infants may show an increase in body temperature when receiving intravenous injections of protein hydrolysates (71), thus suggesting that hydrolyzed protein (casein in this case) might contain a pyrogenic substance or that this property is inherent in the amino acids themselves when administered parenterally. If the latter, the increase in temperature would be unavoidable. Accordingly, Shohl and associates (92) repeated their studies using crystalline amino acid mixtures. Positive nitrogen balances of the same degree were obtained as a result of the intravenous administration of either the crystalline amino acid mixture or the casein hydrolysate. Likewise, a comparable rise in temperature was noted following the parenteral administration of either amino acid mixture.

Farr (93) has extended the studies of Shohl and associates (91, 92) to include the effect on nephrotic children of intravenously administered casein hydrolysate. Nitrogen administered in this manner was assimilated and retained better than when fed as protein. After these injections the capacity of the nephrotic children to assimilate high-protein diets was increased. Intravenous administration at a moderate rate caused flushing and a sensation of warmth; rapid injections produced nausea and vomiting.

Studies with adults have shown that those obnoxious side reactions associated with the parenteral administration of protein hydrolysates may be eliminated if more highly refined solutions (85) are used and the rate of injection reduced (84, 94). When the amino acid solution was administered at the rate of 1 to 2 gm. amino acid nitrogen (approximately equivalent to 7 to 14 gm. amino acids) an hour, over 95 per cent of the amino acids was utilized (94). Patients with malignant growths, hypothyroidism, chronic infections, chronic nephritis, or cirrhosis of the liver were used as subjects by Altshuler and associates (95, 96). The solutions were an acid hydrolysate of casein with one per cent tryptophane added for intravenous and intrasternal injection, and an enzymic hydrolysate for oral administration. The intrasternal route allowed as rapid utilization of the amino acids as the intravenous route. The oral administration of the solution, whenever permissible, was as effective as intravenous injections and clinically the ingestion of protein nitrogen in the form of amino acids gave better results than did a high-protein diet. The factor responsible for these differences was undoubtedly the more rapid absorption from the gastro-intestinal tract of amino acids ingested as such, as compared with intact protein (97, 98).

Until recently nothing could be done to supply the essential amino acids to persons unable to take sufficient protein by mouth. In operative cases an adequate supply of protein is most important in three ways: (a) to protect the liver from possible toxic effects of anesthesia (99, 100); (b) to prevent tissue edema which interferes with healing of wounds (101–103); and (c) to supply the essential nutrients required for tissue repair and regeneration (104–107). The plasma protein deficit in patients with nonhealing ulcers and burns responded in most cases to amino acid therapy (96, 108). Clinical improvement in muscular dystrophy was also quite striking, with relapses occurring when therapy was discontinued (96).

The fact that the buffering capacity of a protein hydrolysate is much greater than that of an equivalent amount of protein favors the use of the hydrolysate as an effective natural antacid in the treatment of peptic ulcer; at the same time an available source of amino nitrogen is supplied for body metabolism (109). Common practice at present is to administer inorganic compounds to such patients. The therapeutic value of this depends either upon the alkalinity or adsorbing power of the compound. However, such therapy is detrimental to other functions of the body; the alkaline salts not only affect acid-base balance *in vivo* but are responsible for destruction of thiamin and possibly ascorbic acid in the gastro-intestinal tract prior to absorption (110, 111). Adsorbents, such as magnesium trisilicate, are very effective in removing thiamin and possibly other members of the B complex from solution prior to absorption (111). This conclusion is supported by the fact that subjects with peptic ulcer, despite subsistence on an adequate diet, excrete exceedingly small quantities of thiamin in the urine (112) and have low-plasma ascorbic acid values (110). The foregoing objections to antacids do not apply, however, when amino acid preparations are used in the control of gastric hyperacidity.

RECAPITULATION

The following facts covered in the preceding review are worthy of re-emphasis.

1. The daily protein requirement of man may be regarded as 1 gm. protein per kilogram body weight. In growing children and in pregnant and lactating women the need for protein is proportionately larger. These standards are acceptable only when the quality of the protein (*i.e.* with respect to its essential amino acid composition) is good.

2. The essential amino acids are: lysine, tryptophane, histidine, phenylalanine, leucine, isoleucine, threonine, methionine, valine and arginine. Tyrosine and cystine,

while not essential, may be important since they replace methionine and phenylalanine to a limited extent. Only a few of the specific functions of the essential amino acids are known today.

3. Nitrogen balance studies and amino acid analyses have shown that animal and milk proteins are superior to the cereal proteins as sources of the essential amino acids. A deficiency of an essential amino acid in the dietary prevents the attainment of nitrogen equilibrium.

4. The most common and serious sign of chronic, inadequate protein nutrition in man is the decrease in the concentration of the proteins in the blood serum (hypoproteinemia) leading to edema. The primary dietary deficiency is not in *quantity* but *quality* of protein. Both hypoproteinemia and edema disappear when sufficient quantities of suitable proteins are included in the diet.

5. Closely related to nutritional edema are conditions of lowered assimilative ability on the part of the body or of protein wastage caused by infections or intoxications.

6. The ingestion of a protein-free diet will induce development of a hypoproteinemia more rapidly than fasting.

7. The characteristic hypoproteinemia and edema during pregnancy and lactation are due to plasma hydration and the marked impairment in serum protein formation to which individuals in such states are subject.

8. A chronic deficiency of dietary protein retards the rate of hemoglobin formation so that anemias develop.

9. The rat is able to subsist on a diet in which the 10 essential amino acids are practically the sole source of dietary nitrogen. Protein hydrolysates are also as effective as unhydrolyzed protein in promoting growth in rats.

10. The 12 amino acids, previously shown to be dispensable for rats and dogs, are also dispensable for man.

11. Of the 10 essential amino acids, 8 (lysine, tryptophane, phenylalanine, leucine, isoleucine, threonine, methionine, and valine) are required for maintenance of nitrogen equilibrium in man and are, therefore, considered to be necessary constituents of the human dietary. Arginine and histidine are not necessary for the attainment of nitrogen equilibrium in the adult, but the former plays an essential role in spermatogenesis. No specific metabolic or functional process has, as yet, been shown to be dependent upon the presence of histidine in the dietary. Specific data on the quantitative requirements of the human for the essential amino acids at present are lacking. A simple technique is described for obtaining this information, based on the criterion of nitrogen equilibrium.

12. The oral and parenteral administration of protein hydrolysates containing all the essential amino acids, as well as solutions of the 10 essential amino acids, effect a prompt regeneration of serum protein.

13. The organism is able to retain amino acids even when rapidly injected intravenously; the losses in the urine and destruction *in vivo* are not appreciable.

14. In cases of nutritional hypoproteinemia, the regeneration of serum protein is secondary to restoration of tissue protein losses.

15. The obnoxious side reactions, *i.e.* temperature elevation, nausea and vomiting associated with the parenteral administration of protein hydrolysates, are more frequently noted in infants than in adults and are not commonly due to the presence of a pyrogenic substance in the hydrolysates but result from the amino acids themselves. The use of more highly refined hydrolysates and reducing the rate of injection will obviate these reactions.

16. The allergenic properties of protein are not apparent in the hydrolysate.

17. Patients with malignant growth, hypothyroidism, chronic infections, chronic nephritis, cirrhosis of the liver, non-healing ulcers and burns, and muscular dystrophy show striking responses to amino acid therapy.

18. The oral administration of a protein hydrolysate, whenever possible, is as effective as intravenous injection. Clinically, the ingestion of protein nitrogen in the form of amino acids gives better results than a high-protein diet.

19. The marked buffering capacity of a protein hydrolysate, many times that of an equivalent amount of protein, favors its use as an effective natural antacid without interfering with other metabolic functions.

CONCLUSIONS

Only within recent years have protein hydrolysates been employed in experimental studies on man with the view toward their use as a practical substitute for dietary protein. The beneficial effects, following plasma protein injections repeatedly observed in the present war, testify to the soundness of this form of therapy. The organism in shock appears to be able effectively to use intravenously administered amino acids. After the war, plasma will no longer be freely donated so that the use of intravenous plasma protein therapy is expected to be greatly restricted by the prohibitive cost of the processed material. Attention should then be turned to the use of the non-antigenic protein hydrolysates for parenteral protein alimentation and for effective serum protein formation, thereby raising the colloidal osmotic pressure of the plasma.

Recent attempts to administer intravenously gum arabic, egg albumin, or gelatin as a means of raising the colloidal osmotic pressure of plasma have proved unsatisfactory; all three substances cause degenerative and proliferative lesions particularly in the glomeruli of the kidneys (113). The clinical use of whole bovine plasma and serum as substitutes for human plasma is also contraindicated at present (114, 115); these materials contain hemolysins and hemo-agglutinins for the human red blood cells. However, the intravenous injection of bovine serum albumin (116–120) has yielded more favorable results; a much lower incidence of reactions is observed. Because the globulins tend to cause foreign protein reactions, they are considered less safe for practical use than the albumins (120).

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ASCORBIC ACID IN INSTITUTIONAL FOOD[1]

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NAGEL and Harris (1) have reported very high losses in thiamin and ascorbic acid in restaurant food. The loss of ascorbic acid averaged 45 per cent after cooking and 75 per cent after a 3-hour period on the steam-table. In some cases the losses were as high as 95 per cent. They also commented on the dearth of information on the losses in nutrients in food served in restaurants or institutions.

We have been noting the ascorbic acid content of fruits and vegetables served in this institution over a period of several years. We use both fresh and canned foods freely and ordinarily serve potatoes twice a day. The canned goods come from all parts of the country; the fresh vegetables from the South and West reach us usually 7 to 11 days after harvest. During the summer the fresh vegetables purchased are produced within a radius of a few hundred miles.

Because of class schedules, patient routines and clinics the serving hours in this institution are short. Our problem has been rather to develop methods of preparation for large quantities of food which will result in products of good color, texture and flavor. Service is started first for two groups of about 400 and 500 each and for a group of 500 half an hour later. The actual service periods are 30 minutes for one group, 1½ hours for the other groups. In the kitchen, preparation is staggered for many of the items, particularly potatoes, with the last lot ready about midway during the serving period. In general, under this system food is held on the steam-tables or on the electrically-heated food conveyors considerably less than one hour. The maximum time for both preparation and service is never more than 3 hours.

EXPERIMENTAL PROCEDURE

Preparation. Methods of preparation were controlled to the extent that this was possible with regard to the duties which ordinarily proceed in a routine manner in the institutional kitchen.

Sampling. Large samples (100 to 200 gm.) of the fresh or canned vegetables were taken as follows: 1. Just as the cooking process was started. 2. When the product was considered done. 3. After 15, 30, and 60 minutes on steam-tables. These samples were taken immediately to the laboratory where 10 gm. was weighed out, covered with 3 per cent phosphoric acid, and refrigerated until analysis.

Method of Analysis. Ascorbic acid was determined 5 or 6 hours after collection, using the Bessey procedure (2).

RESULTS

Table 1 summarizes the results. The ascorbic acid values obtained for the foods agreed with values given by other investigators (3, 4), with the exception of the canned peas. All determinations on these were lower. The peas were the commonly used early June variety, of a satisfactory flavor and tenderness.

TABLE 1

Ascorbic acid losses in vegetables during cooking and holding

	NUMBER OF DETERMINATIONS	TIME OF PREPARATION	VITAMIN C CONTENT PER 100 GM.				AVERAGE PERCENTAGE LOSSES			
			Before cooking (range)	Av.	After cooking (range)	Av.	After cooking	After holding 15 min.	After holding 1 hr.	Total losses
		minutes	*mg.*	*mg.*	*mg.*	*mg.*	%	%	%	%
Canned asparagus	24	20	12.0–19.3	16.0	10.0–17.1	14.0	12.5	7.1	21.3	31.0
Fresh asparagus	12	40	16.0–23.0	19.0	14.0–18.0	17.0	10.5	5.8	17.6	26.3
Cabbage	12	30	21.0–26.0	22.0	12.0–19.0	13.0	40.9	7.6	23.0	54.5
Winter carrots	22	35	2.0– 8.0	4.0	2.0– 5.0	3.0	25.0	0	33.3	50.0
Cauliflower	6	20	18.0–32.0	26.0	18.0–28.0	23.0	11.5	8.6	20.0	34.5
Canned peas	22	20	4.0– 8.0	6.0	3.0– 7.0	5.0	16.6	0	20.0	33.3
New potatoes	8	30	13.0–17.0	15.0	13.0–17.0	14.0	6.6	14.3	50.0	53.3
Old potatoes	30	45	7.0–15.0	10.0	6.0–13.0	9.0	10.0	22.2	44.4	50.0
Sauerkraut	6	45	16.0–19.0	18.0	1.0–12.0	10.0	44.4	0	20.0	55.5
Canned spinach	24	30	7.0–20.0	13.0	6.0–18.0	10.0	23.0	0	10.0	30.7
Canned string beans	18	30	3.0– 6.0	4.0	3.0– 4.0	3.0	25.0	0	33.3	50.0
Canned tomatoes	20	30	15.0–22.0	18.0	14.0–20.0	16.0	5.5	0	6.2	16.6
Canned wax beans	24	30	5.0– 9.0	8.0	5.0– 9.0	7.0	12.5	14.2	28.5	37.5

The ascorbic acid losses in cooking varied from 5.5 per cent for canned tomatoes to 40.9 and 44.4 per cent for cabbage and sauerkraut. The more rapid heat penetration and the acidity of the tomatoes probably account for this difference. About 300 lb. cabbage was usually cooked at one time but even so the flavor and color were excellent. Cauliflower was not usually served to the larger groups and consequently was cooked in much smaller lots with a loss of only 11.5 per cent in cooking.

There was some loss in ascorbic acid of certain vegetables during the first 15 minutes on the steam-table. The values at 30 minutes were not included as the majority of foods showed little change. The losses during the hour of holding varied from 6.2 per cent for canned tomatoes and 20 per cent for sauerkraut, to 50 per cent for new potatoes.

SUMMARY

Losses, during cooking, of ascorbic acid in canned and fresh vegetables prepared in large quantities varied from 5.5 to 44.4 per cent. Losses during one-hour holding periods on the steam-table varied from 6.2 to 50 per cent.

[1] Received for publication June 10, 1943.

Total losses during cooking and holding varied from 16.6 to 55.5 per cent.

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The Army Dietitian in the South Pacific Theatre of War

From an island in the South Pacific where she was assigned to duty with the Johns Hopkins Hospital unit in June 1942, Lt. Kathleen Lewis, M.D.D., A.U.S., writes as follows:

"Several weeks ago I had an opportunity to take a jaunt with some soldiers and a few officers interested in feeding problems on the island . . . and by the end of the day I was thoroughly convinced that there is no need for any starvation here. One can stop any place, pick a few leaves, stew them up in cocoanut milk, and have a fancy meal in short order. Of course bananas and cocoanuts are plentiful and just at the moment pineapple is available—such pineapple I never tasted in my life . . . I've just finished one—sort of a high-vitamin tea party . . .

". . . we went back to an area where 8 natives had prepared fires in their own rustic manner—two large logs laid parallel with crosspieces of smaller green wood. Here they had gathered samples of all the flora we had seen growing and were ready to cook them. It was cookery in its real, back to nature form . . . the native cannot be bothered with the pots and pans, pack animals, baskets and tents such as we carry on an ordinary camping trip. . . . He just takes himself, and a very useful, single piece of equipment—an 18-inch long, wide-blade knife. With this, he does everything necessary for his comfort, from hewing out a home or shelter and furnishing it down to gathering and preparing his food.

"I saw a wonderful bit of steam cookery demonstrated in the following manner: The native whacks down a length of bamboo, about 3 inches in diameter. This he cuts into 2-foot sections at the joint, so that one end is sealed naturally. Then with the bush knife, he deftly hacks the skin off one of the native vegetables which resembles our sweet potato, on to a banana leaf. Then, even more deftly, he flourishes his knife and produces French fry cuts in a flash, so perfect that I'd be willing to put them up against any machine-produced ones and win a prize. He washes these in the nearest water; then he stuffs them into the green bamboo tube. When the tube is filled, he stuffs the open end with tender greens—fern fronds or young leaves. The tubes are tossed into the fire and left there until they are thoroughly charred—like our roasting ears of corn. When the proper sound is produced by a thump of the native thumb, the tube is rolled out of the fire, on to banana leaves and split lengthwise with the knife, revealing a well-steamed meal of sweet potato. After the meal, the native simply rolls up the banana leaves and empty bamboo tubes and lays them under the nearest tree—a unique and labor-saving bit of dishwashing and housekeeping.

"In fact, all of life is simple here—for the native, that is. He digs up, shakes down, or whacks off his next meal whenever he feels the need for food and well fed he is, too."

"Queer Foods"

In his botanical ramblings of 22 years in Old World tropics, Dr. E. D. Merrill of Harvard's Arnold Arboretum has eaten locusts, parrots, bats, and snakes, and liked them. He probably knows more about tropical foods than any man in the country. . . . Dr. Merrill is no eccentric. He simply ran short of food in the jungle and had to fend for himself. Once in central Mindor his Thanksgiving dinner consisted of two broiled wood rats and boiled fern tips.

In eastern North America . . . there are over 1000 different species of wild plants of which the tubers, shoots, leaves, fruit, and even the flowers can be eaten. Harvard is doing something to bring these to public notice in a forthcoming volume by Fernald and Kinsey on "Native Food Plants in Eastern North America." If rationing becomes very much stricter that opus may well become a best seller. The Government is so keenly aware of the possibilities of wild food that the War Department has already published Technical Manual 10-420 on "Emergency Food Plants and Poisonous Plants of the Islands of the Pacific." As the title indicates, the manual is addressed to our armed forces in the Far East. The Government Printing Office sells the manual for 15 cents, if you are interested in dining on palms, ferns, and flowers that grow in the southern parts of this country and are like their counterparts in the Pacific.—*From Science News in Review, The New York Times, August 29, 1943.*

THE CARE OF EQUIPMENT IN WARTIME[1]

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THE institution that lacks food service equipment today is in a sorry predicament, since the possibility of finding a dealer who might happen to have a few pieces on hand is remote. Those administrators who were far-sighted enough to replace worn-out articles with new while they were still available have a problem, too, for even new equipment will not wear indefinitely.

We do know, however, that the life of any equipment can be prolonged by proper care. This involves, first of all, a personnel problem. One must have employees who understand the care of equipment or who can be taught, by constant repetition if necessary, how to care for it. Someone in the dietary department must have the time not only to instruct the employees but to check often enough to make sure that instructions are being followed.

For the unusually busy dietary administrator it is hoped that the following suggestions will serve to remind her of certain principles which she may already have learned in academic courses or as a result of sad experience.

In the Fairmont General Hospital, employee education has been stressed by means of printed instructions framed and hung over each piece of equipment. These instructions consist of simplified "step by step" directions for operation and care to which the employee can refer after he has been verbally instructed, thus forestalling the familiar alibi, "I didn't know how it worked," or "I didn't understand the explanation as it was too technical."

It has been said that women do not appreciate or understand machinery and that, as a result, one of their shortcomings is failure to keep machinery oiled. But if they can be made to understand that holes are provided solely for this purpose in each piece of machinery, they can remind the engineer, if necessary, that the machine needs oiling at proper intervals and see that this is done.

The first step in a campaign to conserve equipment is to examine every piece that has moving parts. Where there is movement, there is friction, and without sufficient lubrication there will be wearing away of the metal and eventually the machine will fail to function.

You will probably say, "Our engineer takes care of that." But it often happens that the engineer becomes so engrossed with the boilers, laundry equipment, new partitions, the ice machine or some interesting piece of equipment in the x-ray department that he tends to overlook the mixers, automatic toasters, dishwashing machines, and vegetable peelers in the kitchen. Naturally, you yourself are not expected to know how to take the motor of the ice cream cabinet apart and reassemble it. But you should be able to recognize the parts that need care, to report these to the maintenance man when necessary, and to have employees of the dietary department take care of these parts so far as possible, thus relieving the engineer of unnecessary work. After proper oiling, cleanliness is a factor, for motors must be kept dry and clean.

Following are some specific suggestions concerning the care of essential items of equipment.

Bake Ovens and Ranges. All petcocks and burners should be checked to guard against dangerous and expensive leakage of gas. The interiors of ovens should be cleaned after use to remove carbonized juices from pies, etc., which act as an insulator. Oven door hinges should be kept clean. The exterior of ovens and ranges should be painted every 6 months. Gas burners usually can be removed for cleaning and particles of food freed from the burners by using a pin or wire.

Mixing Machines. These, literally, are now almost worth their weight in gold. Bench-type mixers should be installed on a very rigid bench or table capable not only of supporting the weight of the mixer but of withstanding the vibration. The mixer should be set level so that the mechanism and internal oiling system will function properly. Drain the oil from the gear boxes at regular intervals and replace with new oil. If the instruction card or book has been lost or misplaced write the manufacturer immediately for another and always keep these instructions near the machine. Mixers, grinders, and slicing machines can be timed for the particular type of food used. A heavy batter, for instance, cannot be beaten with the high-speed whip without straining the motor; likewise, firm, tough meat will not go through the grinder rapidly without undue friction which generates heat and ultimately lowers the efficiency of the blades. Your mixing machine is comparatively uncomplex, but it does need care. The manufacturer has built it with the idea of a high standard of performance, but it must not be abused.

Don't permit employees to knock the batter from the beater. This may not only crack the whip but will scrape off the tin coating and bend the bowl, putting the whole machine out of line. Insist that they use a rubber scraper.

Electric Broilers. These are easily cleaned if they are wiped with a damp cloth both inside and out before they are entirely cool. Dry them carefully with another soft cloth or paper napkin.

Dish Tables. Those with galvanized tops should be dried after use. The pipe standard or angle iron legs should be repainted every 6 months and any loose parts soldered to prevent corrosion. Dish tables with stainless steel tops need little maintenance unless there are loose corners or cracks which can be soldered.

Potato Peelers. A steam hose is excellent for cleaning these. If the revolving disc is worn so that it does not operate well, it should be replaced. The peeler body can be repainted if it shows signs of rusting. Overloading peelers is hard on the potatoes, carrots, or turnips, as well as the machine itself.

Cooks' Tables. If of wood, they should be scrubbed daily with a brush, soap and detergent. A dishwashing machine powder dissolved in water and allowed to stand for an hour on the table will serve to bring the grease to the surface and may then be wiped off. The table top should be wiped dry after use since moisture which remains on the top for any length of time will cause it to crack. If you are so fortunate as to have ammonia on hand, a solution of this will help to whiten the wood. Cutting directly on the surface of the wooden table is a not uncommon practice which should be corrected by insisting on the use of a special cutting board. If the top has already been damaged the uneven surface can be planed smooth.

Dishwashing Machines. Oiling of these is particularly important since they are in use daily and almost constantly. The machines should be de-limed carefully and frequently. If acid is used, followed by scraping, the acid may eat through the lime deposit into the metal and scraping may break the surface of the metal. Therefore, when

[1] Presented before the West Virginia Dietetic Association, Parkersburg, May 3, 1943.

acid is used the machine should be operated afterwards for a short time to rinse the metal thoroughly. If this precaution is not observed, rusting will result, followed by tiny perforations in the metal. A proper washing formula used routinely will prevent or reduce the formation of lime.

After use the machine should be well dried with a cloth. In actual practice this is seldom done but if you want your machine to last it should be remembered. The side doors of the machine should be left open after use to dry out the interior thoroughly and prevent the condensation of moisture around the revolving parts which eventually causes rust.

Following are other suggestions for preserving the life of your dishwashers: Read directions and follow them specifically. Don't guess. Don't overload racks with dishes. Place dishes on edge in the rack, cups and glasses inverted, and don't crowd trays or conveyors. Don't permit wash or rinse nozzles to become plugged; unless they are quite open the full amount of water will not be available to wash the dishes thoroughly. Maintain the wash water at a temperature not less than 140 nor more than 160°F. The rinse water temperature should be 180°F. or over to permit adequate sterilization. Most dishwashing machines require water at a minimum pressure of 20 lb. for efficient operation.

Sectional Steamers. An aluminum paint mixed with a waterproofing compound will prolong the life of this equipment. It should be sprayed or brushed on the inside of each compartment as well as on the doors and remaining exterior.

Jacketed Steamers. Those made of aluminum can be repaired by welding. Soda lime or lye, often used to clean the surface, only damages it in time.

Steam-Tables. Water pans become lined with lime if a suitable detergent is not added to the water to prevent such deposits.

Deep Fat Fryers. A simple program of care and maintenance will not only pay dividends in efficient operation but save fuel costs and conserve fat. The fryer is divided into two major parts as far as cleaning is concerned: (1) the fat kettle including the immersion tubes; and (2) the heating system including the gas burners and the interior of the immersion tubes, the baffles and the flue passages. The sediment zone of the kettle should be drained often. If the sediment reaches and coats the outside of the tubes it will prevent quick transfer of heat and cause overheating which results in burned-out tubes and kettle leakages. After removal of the sediment and carbon, clean thoroughly with a solution of tri-sodium phosphate or other good preparations.

Dust and dirt must be removed from the heating system and the interior of the immersion tubes kept free from deposits in order to ensure efficient transfer of heat from the gas flame. Plugged tubes prevent the admittance of the proper amount of air and cause an uneven distribution of heat throughout the kettle, resulting in turn in uneven heating of the fat. Extreme overheating in the front of the kettle, for example, will burn out tubes at or near the point where these are welded.

Refrigerating Equipment. This, like air-conditioning equipment, is mysterious to many restaurant and hotel operators as well as hospital dietitians. When you buy refrigeration equipment, you are told that it is automatic. But this does not mean that it will run unattended indefinitely, for a small part out of line may ruin an expensive motor. Likewise, an inexpensive regulating valve, if out of order, may cause pressure to rise so high in the refrigerator that the complete charge of refrigerant will be lost. With a rapid turnover of food products a temperature of only 36 to 40°F. needs to be maintained. Lower temperatures require the use of more power and result in greater wear on equipment.

Proper care of the refrigerator includes the following: Keep coils free from ice and excessive frost. Clean condenser coils on water-cooled machinery. Gaskets are made of rubber which grease will destroy. A new gasket is on the market which will replace the rubber type and which is unaffected by grease. Door gaskets, of course, should be kept tight to prevent leakage. If you have a fan-driven motor it should be lubricated with # 10 or 20 S.A.E. oil every 6 months. Fasteners should be kept free of grease, and hinges lubricated often. Since motors are made almost entirely of brass and copper the parts will be extremely difficult to replace. Motors and condensing units should be oiled once a month with a few drops of # 20 S.A.E. oil. Excessive oiling, however, is harmful. Rubber belts, too, call for critical materials. Check belt tension periodically. A loose belt will mean a belt failure. The tension is right if by means of normal pressure with the thumb the belt can be depressed at the top from three-quarters to one inch. Be sure the belt does not come in contact with oil. If the motor is air-cooled, it should receive a constant supply of clean air, otherwise the fan will draw dust into the motor bearings and winding. Brine refrigeration calls for a check on the acidity and alkalinity, for it is extremely important that brine be maintained at the proper *p*H. Wash drain pans thoroughly once a week and keep free from foreign material to prolong the life of these valuable parts.

A refrigerator is not a pantry. Keep out shortenings, jellies and anything that can be stored on a pantry shelf. Refrigeration space costs more than shelf space.

Coffee Urns. "How to Make Your Coffee Urns Last Longer," a pamphlet issued by a well-known manufacturer, lists the following: Prevent burnouts—watch the water jacket gauge. Prevent leaking faucets—clean faucets regularly. Preserve the finish—regular cleaning will prolong the life of coffee urns. Open water inlet valve very slowly. Don't obstruct safety and vacuum valves. Avoid sudden temperature changes.

China and Glassware. The label, "Handle With Care," in large letters on the barrel or box in which china and glassware are delivered, should not be forgotten immediately after the goods are unpacked. Most breakage occurs during the more hurried and slippery intervals when glassware and dishes are removed from the table and as they are taken out of the dish water. It should be remembered that, like diamonds, china and glassware will scratch china and glassware. The best answer to this problem of breakage is proper supervision. Even so, every glass tumbler is destined to die a violent death; their hard surface, so desirable, is still not hard enough to stand the daily blows and scratches.

Small invisible chips, when subjected to hot water, will soon ruin the appearance of the glass. The sterilization of dishes and glasses should not be unduly prolonged. Hard water causes rapid building of lime scale. Use a water softener which reduces the amount of washing compound necessary and produces a clean and sparkling piece of china or glass. Rubber capped faucets on sinks where glasses or dishes are handled decrease breakage.

Improper loading causes some of the trouble. For careful handling of china, a point to be remembered is not to stack dishes by sliding one on top of another. This produces scratches or disagreeable dull rubbed markings. A scratched glazed surface holds dirt and allows chemicals to make their inroads. Keep china away from direct contact with silver, aluminum or zinc, since these soft metals cause discoloration. Poorly organized methods

of handling and storing clean dishes are additional causes of breakage.

Avoid overheating ware on hot plates or ovens. Discoloration as a result of this can be removed by sodium hypochlorite.

Placing mats on the floor in front of coffee urns, water faucets or sorting tables is a wise precaution against dish and glass breakage and chipping.

Some miscellaneous suggestions for the care of equipment are the following:

1. Thermostats should be checked so that only the amount of heat necessary for a given operation is used.

2. Flues should be cleaned. Carbon acts as an insulator and thus wastes heat.

3. Food which has been salted should not be left in aluminum utensils because of the corrosive action.

4. Each employee should wash off his own rubber dish or utensil scraper and not let it stand in hot soapy water which tends to soften the rubber.

5. Cords are the backbone of electrical appliances. They don't need much care but if they lack the little they need a "short" may result or worse, a fire. Most trouble arises from yanking a cord from the outlet by grasping the cord itself or even the fixture instead of disconnecting at the outlet. Don't kink or bend cords sharply, for this causes the fine wires inside to break. Use electrical repair tape immediately as it is needed; avoid frayed or broken cords; and loose or broken plugs. Don't overload an outlet with extension cords or appliances; this reduces operation efficiency and damages appliances. Finally, keep appliances turned off when not in use. If a piece of equipment won't work, check the power supply first. If your car motor won't start, you check the gas supply at once—it's the same principle. Then see if all connections from the appliance to the wall outlet are tight; next, if the lights on the same current are not working, look at the fuses, an extra supply of which should always be on hand. Don't use a penny; the fuse is a protection against fires. If fuses blow out too frequently, the service should be checked.

6. Most breakages of toasters occur when bread crumbs are being removed from the inside. A soft brush for this purpose is the only tool which will avoid injuring the heating elements. Clean the toaster only when cold, using a cloth wrung out in warm soapy water. Never leave water on the toaster. Never clean *any* electrical device unless it is disconnected.

7. Heavy duty kitchen appliances don't need to be babied, but they do need a reasonable amount of care, cleaning and oiling. Appliances in the kitchen which require particularly careful maintenance are of two kinds: (1) Those with motors which require periodic inspection of moving parts and oil; (2) Those with heating elements which need gentle treatment and attention to overheating. Both kinds need to be safeguarded from unusual voltage changes.

The "public enemy number one" of electrical cooking appliances is grease. Grease has a way of seeping into electrical wires, connections and terminals, forming carbon and ruining materials that cannot readily be replaced at present.

If you are thinking of buying a new piece of equipment, first ask yourself, "Can I get by without it?" The best way to do without is to maintain and care for what you have. If you must have repair parts or replacements go to your regular supplier first. Then try others or look in buyers' directories before you use the WPB priorities form.

ACCIDENT PREVENTION

Among the materials collected by a committee of the Administration Section of the American Dietetic Association appointed to study canteen courses, under the chairmanship of Katharine Harris, Institutional Management Department, Cornell University, is a list of rules to be observed by canteen workers in order to avoid accidents, submitted by Frances Dunning, University of Minnesota Farm, St. Paul. They were compiled by the St. Paul Red Cross and are grouped under three headings—cuts, burns, and miscellaneous. The list, mimeographed on a sheet of paper suitable for posting in a stationary canteen, follows:

Cuts:

Correct storage arrangement of knives and other cutting tools.
Use well-sharpened cutting tools.
Use cutting boards.
Cut downward (never toward the hand).
Place sharp tools to be washed on utility tray (never leave these in dishwater).
Use correct size and proper blade.
Work only with dry hands and clean and dry-handled tools.
Use mechanical peelers if possible for paring fruits and vegetables.
Use care in handling and storing broken dishes, defective utensils, tin cans.

Burns:

Use pot holders in handling hot utensils (*not* towels, aprons, etc.).
Bring bake pans well to front of oven with proper tools before attempting to remove them.
Use care in removing covers from steaming foods.
Guard against drops of fruit syrup when removing pans.
Guard against spattering grease.
Don't fill kettles too full.
Don't crowd burners or ovens.
Guard against splashing when stirring.
Pour boiling water on vegetables, etc. (don't drop food in hot liquids).
Use heavy utensil and basket when frying in deep fat.
When frying, use only utensils having one long handle and turn handle inward.
Use metal holders when placing and removing steam-table pans.
Keep all openings of steam-table well covered.
Don't handle dry ice with bare hands.
Allow steam-table, oven, or stove to cool sufficiently before cleaning.

Miscellaneous:

Avoid slipping—wipe up spilled food or liquids immediately.
Avoid collisions with objects or people.
Avoid stumbling over misplaced objects.
Don't overcrowd trays.
Place trays on firm surface (avoid tilting).
Don't turn suddenly when carrying tray.
Turn on hot water faucet slowly.
Handle electric equipment with dry hands.
Check pilot lights.
Check gas jet at coffee urn, steam-table, oven and stove.
Check electric stove.
Close all cupboard doors carefully.
Use "In" and "Out" doors carefully.

Editorial

LAST CALL TO THE PITTSBURGH MEETING

All who plan to attend the October 19–22 Wartime Conference of the American Dietetic Association and have not already made train and hotel reservations, should lose no time in doing so. Dietitians, doubtless, will need no word of warning about crowded dining cars en route, but with their customary foresight will travel with the traditional box lunch, packed with protein, minerals and vitamins to fortify the inner woman for the busy days ahead.

In keeping with a fine sense of hospitality, yet with a weather eye on rationing, the local convention group, we are assured, have been busily assembling thrifty wartime menus with a real Pennsylvania Dutch flavor. And all who have delved into the dishes concocted under the aegis of this accomplished school of regional cookery can wholeheartedly attest their substantial and satisfying quality.

It is a happy thought, too, that the healthy appetites for which dietitians are justly famed may now be unhampered by the peacetime rulings of Emily Post. For we understand that the official barriers against the two-handed grip on the drumstick, the free-handed mopping up of the last bit of gravy, and the half-Nelson hold on the upturned soup bowl are down for the duration, with the clean plate the very essence of wartime table etiquette.

Come prepared, too, to walk—if you wish to see the city's sights. Idle "tripping" as we have known it in happier days, is out, due to transportation difficulties. But this restriction, after months or perhaps years of training in the daily marathon of hospital and institutional food services, will not deter the dietitian.

All signs, including the program in the capable hands of Katherine Mitchell Johnson (*see* the September JOURNAL pp. 672 and 674), point to a better than ever annual gathering—filled with nourishment for mind and body, packed to the brim with the enthusiasm toward our jobs and that *joie de vivre* for which every annual meeting of the Association is noted. Let this spirit of zestful accomplishment continue unabated in these dark days of war, for it should serve our country better than fearful and uncertain probings toward present and future intangibles. We know what our job is and we can do it.

PRODUCE AND CONSERVE—SHARE AND PLAY SQUARE WITH FOOD

The rallying slogan, "Food Fights for Freedom," has heralded a call to action—to produce and conserve, to share and play square with food—a call to action that must not be ignored by freedom-loving Americans. In the words of Judge Marvin Jones, the American people will *do* the job if they know *what* to do and *why* it must be done. Now that we have entered the belt-tightening phase of a grim second world war, food, that essential for which wars have been waged and through which other wars have been won, more and more takes the center of the stage.

The situation ushers in anew the imperative need to preach the gospel of the clean plate, to fulminate against the crime of "throwing victory away in the garbage can." Food becomes symbolic, something more than the satisfaction of the senses, something more than just nourishment. Its conservation becomes the very essence of ultimate victory and peace, for food wisely used and shared is a mighty weapon of war.

On the shoulders of every dietitian and nutritionist rests the responsibility of promoting by precept and practice a war against waste, of inculcating by all possible means an awareness of the stern significance of food waste, which in reality constitutes active aid to the enemy.

By the time this JOURNAL is off the press, the campaign which the Government, aided by major and minor advertising agencies and food distributors and large and small publications, is actively promoting, will be well under way. Little more, then, need be said concerning its purpose and scope. All, perhaps, that need be said here is that it will be a *continuing* job, a long-range campaign, one that must be constantly kept before the attention of the public. It is a "year-round job—a job for everybody." But the success of the venture wholly depends upon the intelligent and sympathetic understanding on the part of the lay public of the purpose and fundamental need of such an undertaking.

The civilians at home must bridge the gap between the foxhole and the fireplace. If they can be made to understand that individual derelictions, when multiplied, can delay the return of peace or even nullify our chances for victory, they will act accordingly.

It is within the dietitian's power, because of her trained ability, to make people understand the reasons why they must do thus and so. This skill, so evident, for instance, in her teaching of the ill—notably the diabetic—should serve her well in the present emergency. For as Judge Jones has said—if the American people can be made to *understand* the need, they will act.

THE TECHNIQUES OF RADIO SPEAKING

In view of the probable increasing demands which will be made upon dietitians and nutritionists to address the public on the radio, the suggestions of those who have made a study of the peculiar problems of preparation and delivery of such addresses should be of interest.

Dr. Nina Ridenour, New York City Committee on Mental Hygiene, State Charities Aid Association, presenting the viewpoint of a psychologist, offers the following suggestions to radio speakers[1] in the April *American Journal of Orthopsychiatry*.

First of all, make your talk simple, which means speaking as to a person who is intelligent but not necessarily well educated; avoid technical words, too many adverbs, and "the use of words which, though relatively commonplace, have come to have a special meaning or an unusually full meaning in your particular field." Samples of such "dangerous" words in psychiatry and related fields are: *emotional, social, maladjustment, reality, function, needs, therapy, aggression, evaluation, causal.* These and others might be added to the dietitian's and nutritionist's list of words to be avoided in talks to the lay public. Words of common usage among well educated people but uncommon to the average person are listed as follows: *data, clarify, minimal, integrate, coordinate, supplement, assumption, qualification, implication, adequate, valid, fundamental, specific, resources, technique, constructive.* Some adverbs that make the content heavy are: *theoretically, typically, potentially, tentatively, comparatively, objectively, unconsciously, primarily.* Avoid also combinations of the above types of words which, strung together, result in "jargon" like the following, which were copied verbatim

[1] A list of publications concerned with radio speaking, compiled by the Community Education Section of the American Dietetic Association in 1941, is available free from the Chicago office.

from radio talks: *emasculated curricula, causal factors, reciprocal relationships, distortion in energy utilization, situational dependency.*

Other points to be observed in preparing a radio talk, many of which are fundamental and well-known to all who have spoken in public or conducted demonstrations, include: selection of a topic of general interest; use of short sentences, narrative form, specific statements ("philosophizing is disastrous—statistics are poison"), forceful opening sentences; and the development of one idea, from all angles, rather than of several ideas. Brevity is important, (six and one-half double-spaced typewritten pages with one and one-half inch margins is maximum for twelve and one-half minutes). In summing up, Dr. Ridenour states, "Keep constantly in mind, (1) to whom you are to speak, (2) what you are trying to get across. You are talking to an audience that is not an audience, but individuals scattered here and there in their own homes. . . . Do not fall into the rut of approaching them as you would the readers of a professional journal. Radio is a powerful medium for new techniques in education. Study the ways in which it differs from the educational media with which you are more familiar."

When you deliver the paper, make it sound like talking, not reading, urges Dr. Ridenour. Scientific attitude and popular appeal are not incompatible. The take-it-or-leave-it manner of plodding presentation acceptable to those long inured to the verbal monotones of scientific meetings will leave you without a radio audience in a few minutes. It may be advisable to pitch your voice a trifle lower than usual if you are a woman. "Think about your audience. Don't bury yourself in your paper. Put color and emphasis in your words. Mark a few time intervals in the margin. Enunciate clearly."

In a critical study of health education, with special reference to broadcasting, made by the Committee on Medical Information of the New York Academy of Medicine in 1942, the emphasis on the spoken word was stressed as basic to any consideration of techniques in radio. "The spoken word, even though set down on paper, remains a spoken word. . . . In the spoken word one addresses himself to the living person, while in the written word one addresses himself to the subject matter. This apposition of person and matter has the deceiving appearance of extreme simplicity. The implications of the apposition are, however, involved and enormous. Effectively to address one's self to a person, one must be competent to recognize and deal with all the psychological conditions of the act. To address one's self to a subject matter requires no more than adequate knowledge of the subject and a competence to organize that knowledge in an orderly fashion."

The Committee is of the opinion that the utility of the dialogue and particularly of the drama in health education must be acknowledged to be very narrow, not only because of the larger costs in effort and money, but because "a conversation to be a dialogue must be a discussion, a discussion containing an element of contest, of opposition in opinion, in knowledge, and in emotions. The moot subject has no place in health education. . . . The list of possible subjects for dialogue discussion need not be long to make it evident that the bulk of health education, that concerned with personal hygiene, health promotion and disease prevention, does not lend itself to dialogue presentation. Furthermore, the radio dialogue is verbose in comparison with radio talk. It requires much more connective verbiage to support and carry its content of ideas." The so-called health drama is, according to this report, not dramatic in most instances and when, as rarely happens, the composition is truly dramatic, it is almost entirely devoid of health education.

An analysis was made of radio programs in the "Highways to Health" series conducted by the New York Academy of Medicine, which yielded some interesting results but, as the report states, not much of a definite nature could be derived from the analysis since certain basic factors were unknown and unascertainable. It did, however, appear that certain subjects elicited the larger response, as measured by requests for copies of the talks, among them talks on nutrition subjects such as, "The Child That Won't Eat"; "The ABC Aids to Nutrition"; "Facts and Fallacies About Food"; "Some Problems of the Diabetic"; and "Can Emotional Disturbance Cause Indigestion?"

From an analysis of specific radio papers and an inquiry into the causes of the deficiencies, certain principles were then propounded. The health educator must, for example, know what his objectives are. He must, as stated above, cast his speech in spoken rather than written language. Effectiveness can be gained by suiting subject matter and technique to the particular audience group addressed, the assumption being that only those who recognize that its substance is particularly directed to them will "tune in" on the address. (This last statement was based on an analysis of radio audiences available which showed that only a small fraction of the total audience is available to the health educator, and that a paucity of listeners to educational programs is to be found among the lowest socio-economic groups.)

A canvass of those interested and active in radio health education, in an effort to establish how they evaluated this activity, revealed a wide divergence of opinions on many scores, and a predominant conviction that radio health education was not educationally effective. Yet most of those consulted were earnestly convinced that radio could be of great service in the instruction of the public in health matters, and also that the responsibility was incumbent upon health and medical organizations to cultivate and perfect their skills in the utilization of radio.

Current Comment

BROADCASTING TO HOMEMAKERS

An enlightening account of the many qualifications necessary for successful broadcasting of homemakers' programs appeared in *What's New in Home Economics* for January 1943. The author, Marsha Wheeler, herself an experienced radio speaker, is specific in her explanation of what makes a good broadcaster, with emphasis on personal qualifications. She writes for the benefit of the home economics expert who seriously desires to make a place for herself in radio and is willing to "meet its very special requirements."

Miss Wheeler says that "Showmanship is the very essence of the success of any radio program. You may have all the knowledge the textbooks and research laboratories can give you, but if you lack a sense of showmanship, what you give forth over the radio will fall flat. Showmanship is the knack of knowing what material to use; how much to use, how to blend it with human interest, how to inject suspense and climax. It is the knack of getting your listeners' attention and holding it. Any good teacher, any successful saleswoman, must have a sense of showmanship. But nowhere is it so vitally imperative as on the radio, where there are—at present at least—no facial expressions, no gestures, no physical personality to give color and life to words. Words and

tonal inflections alone must be depended upon to reveal the light in your eyes—to convey seriousness, enthusiasm, vitality, conviction.

"A radio program is a show. If you are to prepare a program for radio, and if you give it, you must be first a showman, second a home economist. You must capture your listeners' attention and win their 'yes response' to your personality; then you can proceed to the point of your discussion, remembering always that it is better to make one point, and have it stick, than to make a dozen points, none of which are remembered."

As to personality, the author continues with the statement that this must be evident in one's voice and that a voice recording is the most effective way of discovering one's faults and correcting them. One program director, in explaining why so few home economists had been successful in radio, declared that personality counted for about ninety per cent of success, and technical training ten per cent. He said that most speakers on home economics subjects are "too pedagogical and too technical."

"Probably the next important technique to remember," continues Miss Wheeler, "is that, being an expert, and valuable because you are an expert, you must nevertheless learn to use only the merest fraction of what you know. You must divorce yourself from classroom and laboratory, and visualize yourself as a woman of average family, limited in technical knowledge, limited by natural inertia even in desire to know, beset by family likes and dislikes, by family interruptions, and most of all, by limited income. Such is the woman to whom you must talk, and in her own language, not yours." You will not say, for instance, "cooking unit" but "stove"; instead of such expressions as "buying in excess of current needs" you will say "buying more than you need"; in place of "how to adjust the dietary," say "how to arrange your meals." And you must write your program as conversation, not as literature, using the conversational contractions such as "I haven't," or "he won't." The conversational style makes your program a visit with each individual listener instead of a dissertation delivered *at* her.

THE DIET IN EPILEPSY

Writing in the November 1942 *Wisconsin Medical Journal*, Peterman discusses epilepsy in childhood. He defines idiopathic epilepsy as "a chronic disease of the brain characterized by periodically recurring convulsions, lapses, or abnormal mental states which occur in an individual with an inherited constitutional defect." He continues that while epilepsy is one of the convulsive states, it remains a distinct and separate disease entity, well recognized in medicine, and diagnosed only by exclusion from the various other organic conditions or diseases which produce convulsions.

It is interesting to note, and important for an understanding of the disease, that the electroencephalogram has established proof of the inheritance of the constitutional defect. Patients with symptomatic convulsions, that is, convulsions with some organic basis, have three times as many near relatives with epilepsy as do those with some nonconvulsive disease; those with essential epilepsy, five times as many. The disease is transmitted as a Mendelian recessive.

While epilepsy is one of the oldest diseases in medical literature, the cause is unknown. The seizures usually appear without warning in a healthy child of normal or above-average intelligence. A subnormal intelligence at the onset suggests an organic cause for the convulsions. The physical examination of the epileptic usually reveals no significant abnormalities. However, calcium, phosphorus, and blood sugar determinations should always be made. Low blood calcium values have been found when spasmophilia was not suspected. A consistently low blood sugar, according to Peterman, is not likely to be responsible for true convulsions. Whenever possible, the diagnosis of idiopathic epilepsy should be confirmed or established with an electroencephalogram. If there is still doubt about the diagnosis or if the child does not respond promptly to adequate treatment, a pneumoencephalogram should be made. One investigator found that 90 per cent of epileptic children with normal pneumoencephalograms responded favorably to treatment with the ketogenic diet.

Since the diagnosis of idiopathic epilepsy is made by exclusion, before starting an indefinite course of treatment it is most important that no diagnostic measure be omitted. The most common condition which might produce symptoms simulating *grand mal* epilepsy is the residue of cerebral birth injury.

The longer epilepsy is allowed to continue untreated, the more frequent and severe the convulsions become and the more resistant they are to treatment. Every convulsion leaves some residual, and eventually the recurring seizures leave permanent damage to the brain. The treatment must be adjusted according to the manifestations of the disease, the frequency of the seizures, and the circumstances of the family. A definite daily regimen should be instituted which will provide meals at regular hours and adequate exercise and rest. A daily evacuation of the bowels must be arranged. It is extremely important to correct the fatigue posture which is found in almost every epileptic child. *Petit mal* seizures present the most serious problem in treatment. Parents and physicians are inclined to ignore or to minimize these mild or transitory attacks, not realizing that they are more resistant to treatment and just as serious as are major convulsions. These patients usually develop *grand mal* attacks in the course of time. There is no drug which is effective in controlling *petit mal*.

The ketogenic or high-fat diet, according to Peterman, remains the most effective treatment for *petit mal*. The difficulties are no greater than in diabetic diets. The only limitation to be considered is the expense of fat foods, such as cream, butter and bacon. This treatment, which is aimed at correcting the cause or counteracting its main effect, is preceded by a 10-day fast during which orange juice, diabetic broth, and bran wafers (no food value) are allowed. A total of 200 cc. juice, 400 cc. broth, and 400 cc. water is allowed daily with as many bran wafers as desired. The patient is then given a diet consisting of 15 gm. carbohydrate, 1 gm. protein per kilogram body weight, with the remaining caloric requirement in fat. The daily allowance is 15 calories per pound (33 per kilogram) body weight but need not exceed 2000 calories. A summary of instructions and sample menus for the diets of epileptic children, prepared by Nell Clausen, Milwaukee Children's Hospital, follow:

A gram scale is absolutely necessary.
Add to the diet nothing containing available carbohydrate, protein, or fat which is not included in the calculated diet chart.
Include one egg daily.
Use 300 gm. cream daily if possible to ensure a supply of calcium and phosphorus.
Use some raw fresh fruit and one cooked and one fresh vegetable daily to protect against mineral and vitamin deficiencies.
Bran wafers, diabetic bran breakfast food and "D-Zerta" may be used *ad lib*.
Broth may also be added but must be deducted from fluid allowance.

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Ketogenic Diet for Five-Year-Old Child

Breakfast

30 gm. sliced orange
13 gm. butter
1 egg in omelette
100 gm. 30% cream
May have "Cellu" bran breakfast food

Dinner

30 gm. spinach
10 gm. butter
20 gm. scraped beef pattie
50 gm. cream to drink
50 gm. cream in ice cream (whip cream and flavor with ¼ tsp. vanilla and ½ grain saccharin)
May have bran wafers

Supper

Celery soup: (50 gm. cream, 20 gm. celery, 10 gm. butter)
50 gm. asparagus
6 gm. butter
50 gm. cream
"D-Zerta"
Fluids, 300 gm. (1000 cc. −300 cc. = 700 cc. water to be allowed between meals)

Ketogenic Diet for Ten-Year-Old Child

Breakfast

30 gm. fresh pineapple
20 gm. butter
1 egg, scrambled with cream and butter
100 gm. 30% cream
May have "Cellu" bran breakfast food

Dinner

50 gm. broiled tomato
20 gm. butter
70 gm. steak with mushrooms (no available food value in mushrooms)
75 gm. cream to drink
"D-Zerta" with 25 gm. whipped cream

Supper

Vegetable soup (50 gm. broth, 10 gm. celery, 3 gm. onion, 4 gm. carrot—*or* 20 gm. 3% veg.)
20 gm. butter
20 gm. raw cabbage with 12 gm. mayonnaise
20 gm. bacon
100 gm. cream in cocoa (100 gm. cream, ¼ tsp. cocoa, ½ grain saccharin)
Fluids, 350 gm. (1000 cc. −350 cc. = 650 cc. water to be allowed between meals)

If the calculated diet does not control the convulsions, 5 gm. fat must be added to the daily allowance every week to the limit of tolerance if necessary. When the convulsions are under control the diet is maintained for at least three months. Then 10 gm. protein may be added to the daily allowance. After another month without convulsions 10 gm. carbohydrate is added to the daily allowance. The alternate additions of carbohydrate and protein are made monthly until the protein reaches 2 gm. per kilogram body weight. This amount usually satisfies the child and amply covers his requirements. After six months the daily fat allowance may be reduced by 10 gm. every month. The menus should divide the food into three equal portions to be given at well-spaced intervals through the day, for instance, 7 a.m., 12 m., and 6 p.m. Only water should be given between meals.

SOME CENTRAL EUROPEAN FOOD PATTERNS

The Committee on Food Habits of the National Research Council has prepared memoranda on the food habits of three Central European groups in America. These are part of a series of studies intended to provide nutritionists with a better understanding of the culture and specific food habits of foreign background groups, both in this country and in the occupied countries whose food conditions will be of great concern in the period of reoccupation and reconstruction. According to the Introduction to the series, it is believed that these studies will also be valuable in planning nutrition education and assisting in the adjustment to wartime rationing and food shortages. The first memorandum of the series, that concerned with Italian food patterns, was summarized in this JOURNAL for October 1942. That just received covers Polish, Hungarian, and Czech and Slovak food patterns.

Each memorandum describes the family and social life, and native food habits during the period of greatest emigration, some fifty years ago, and the dietary modifications as the immigrants adjusted to American ways of life and sources of food. Finally, the present food patterns and the probable adjustments necessary under wartime conditions are described, and nutrition education approaches suggested. The following information on the three groups is detailed:

Polish Food Patterns. Many of the changes which have been adopted by groups with a Polish background have lessened the adequacy of the diet. It is desirable, therefore, to foster some of their earlier practices, even when these conflict with the traditional American pattern. In Poland the first meal of the day often included whole-grain cereals or potatoes and salt pork. Eggs, too, were sometimes eaten. Since there is no precedent for eating raw fruits, dried or fresh fruits cooked in porridge might be acceptable. Small children drink milk; in addition, buckwheat, barley or millet cereals can be cooked in milk. Coffee or tea (which was sometimes used as a breakfast beverage in Poland), with boiled milk, also serves as a vehicle for this food.

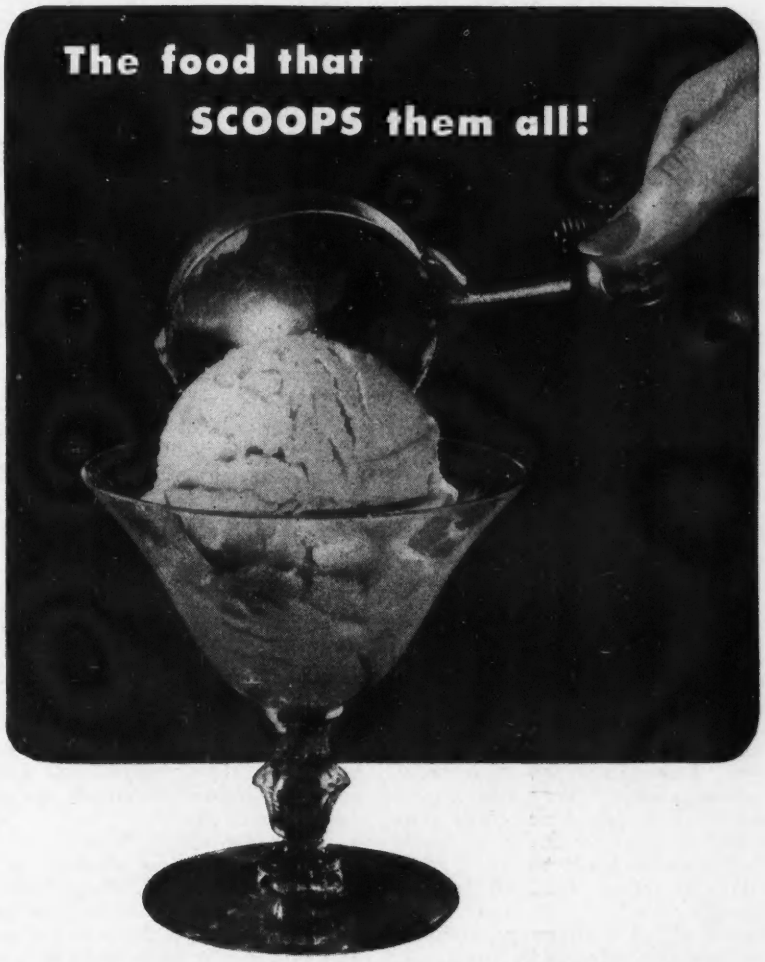
A midday meal of meat, vegetables, potatoes, bread and a beverage has been adopted by Polish-Americans. For industrial workers, who must eat in cafeterias, a number of Polish dishes might be served: *Barszcz*, made with beets, potatoes, sour cream and eggs; cabbage soup, with or without tomatoes; split pea or lentil soup; mushroom and barley soup; raw vegetables—cucumbers, scallions, radishes, lettuce—cut up and served with cottage cheese or sour cream or both; fruit pies, *strudel*, pancakes made with dried fruits or preserves; likewise *pierogi*, filled with vegetables, fruit, cheese or meat. Poles do not like baked potatoes and will not eat potato skins.

The Poles do not have to learn to like whole-grain products. The cereals used in porridges, in soups and with meats are of this type; the bread they prefer is pumpernickel or dark sour rye bread (not whole wheat). Hard white rolls, which are also popular, can be made of enriched flour.

Many Polish foods lend themselves well to packed lunches: raw radishes, lettuce, tomatoes, scallions, etc. wrapped in waxed paper; containers of sour cream or cottage cheese; thermos flasks of rich soups, hot in winter, cold in summer; fruit soups; sandwiches made of home-cooked tongue, meat loaf, meat balls, chopped liver, sausages or smoked salmon; and for dessert a pastry filled with fresh or dried fruit.

The use of meat in soups and in vegetable-rich stews is part of the culinary heritage of the Pole, also the organs and cuts of meat less commonly eaten in America; tongue, liver, kidney, tripe, brain, heads and feet. Poultry giblets, smoked salmon, carp, and herring are also popular. Except for the thoroughly Americanized groups on the Eastern seaboard, Poles on the whole are unfamiliar with shellfish. Unless the habits of the local group are very clearly known to those in charge of the food preparation, shellfish should be avoided.

In view of the social structure of Polish-American urban communities, dietary advice should not come from parents or their delegates but from American leaders in the community or carry the sanction of a person in the public eye. The mother of young children, whose husband is employed in a factory or mine, can be reached through the baby clinic, the radio, the newspaper and perhaps the



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labor union. School teachers, the P.T.A., and local physicians should be enlisted in a nutrition drive; the parish priest should always be invited to participate. For neighborhood work the cooperation of an older, intelligent woman, who is already respected on the block, may be required.

Food behavior is one of the many ways in which the unmarried girl expresses her independence. In addition, many Polish-American girls live away from home and eat poorly and irregularly. For these reasons it is of the utmost importance that this group be reached. To be effective, the appeals must have a beauty and/or patriotic basis. Posters at their places of work might well stress beauty in addition to health.

The married working man can best be reached through his labor union. The tie-up between optimum nutrition and the successful prosecution of the war should be made clear. Since Poles like to attend meetings and lectures, these means should be employed for nutrition education.

To a lesser extent, the rural Polish-American population, like that in urban areas, is in need of nutrition education, particularly in New York State and New England where a one- or two-crop economy is practised. The county agent, the grange, the church and the newspaper can be used to supplement the work of the Red Cross and the P.T.A.

Hungarian Food Habits. Owing to similarities in the food supply, the staple foods of Hungary are very much like those grown in America, therefore there has been little alteration in the diet of the Hungarian background group. Meat, so favored in Hungary, assumes an even larger role here. The white rolls, once an urban or holiday food, can now be had in every corner grocery but by no means have they replaced sour rye bread. Very little sugar is used except for baking and canning. Dried fruits, jams, fruit butters and honey satisfy the desire for sweet-tasting foods. Adult Hungarian-Americans rarely drink milk except in their morning coffee. Children, however, drink milk and also tea and coffee.

Except for the absence of the midmorning and mid-afternoon lunches, the meals served here by Hungarians differ little from those eaten in the mother country. Typical meals are: breakfast—rolls with butter, jam or honey, café au lait; dinner—soup, stewed meat and vegetables, rye bread with sweet butter, pickles, pastry, tea or coffee, wine; supper—eggs or smoked meat, raw vegetables (onions, radishes), bread and butter, coffee or tea, wine. Noodles are popular, cooked in soups, baked or boiled, or prepared as desserts and served with sauce. Many kinds of pancakes and dumplings are made at home.

A nutritionist might begin work in a Hungarian-American community with a lunch-box campaign. Many traditional Hungarian foods lend themselves especially well to lunch-box meals such as one of the legume soups, sandwiches made of cold left-over meat or smoked meat on rye bread or enriched hard white rolls, raw radishes, young onions, cucumbers, a handful of nuts, and a piece of pastry, which would supply most of the necessary nutrients in good proportions. Sandwiches made of cottage cheese and vegetables might also prove acceptable. Harder cheeses or pastry made with cheese would go far to bring up the calcium ration for the day.

A campaign could be instituted in the lunchroom or cafeteria. Hungarian dishes, made from authentic Hungarian recipes, could be served as main dishes, since Hungarians traditionally eat their heavy meal at noon. Goulash made with meat, potatoes, and vegetables; cabbage stuffed with meat and bread crumbs and cooked with tomatoes; potatoes scalloped with eggs; fish stewed with potatoes; noodles cooked in soup; and the many varieties of thick legume soups all lend themselves to quantity cooking and easy service. At the same time posters or leaflets written in Hungarian and English could be prepared, telling why each dish had been chosen, indicating its good points, and showing its relationship to daily food requirements. Information of this kind should be pithily phrased to meet the Hungarian taste for slogans.

Still another channel of communication would be through their organizations whose backing is essential to good attendance and participation in nutrition programs, with cooking classes and demonstrations directed where possible by Hungarian women. The most efficient way of making contacts undoubtedly would be through the central controlling mechanisms. The prestige of Americans is such that they should act as liaison workers in this type of campaign. The actual leaders, however, should be the heads of Hungarian social organizations and local politicians.

If a nutrition campaign is planned for school children, teachers might request the children to bring in lists of proverbs with translations. These could be discussed and analogies drawn between scientific knowledge of nutrition and folklore in terms of specific foods and situations. For example, bread occupies a central place in the symbolism of food; many terms describe its texture and it plays an important quantitative part in the diet. One lesson could deal with bread, with emphasis on the enriched. Similarly, a lesson on meat would demonstrate that the traditional and delicious kidney, heart, liver and blood-sausage dishes are also nutritious and inexpensive. Nutrition education directed at the Hungarian-American group should be phrased in pleasurable emotional terms in line with a famous Hungarian proverb—"We are poor, but we live well."

Czech and Slovak Food Patterns. Czechoslovakia is inhabited by three distinct groups of people: the Czechs in the extreme west, the Moravians in the center, the Slovaks to the east. The dialects are mutually intelligible, but the fact that the Czechs and Slovaks are separate peoples who have been subjected to different historical and cultural influences has had a distinct bearing on their ways of life both in Europe and in America. The Moravians share many characteristics of both groups. The old name "Bohemian" is still in wide use in the American Middle-West in referring to the Czech group.

Czech cuisine was strongly influenced by Germany, Bohemia's northwestern neighbor. The food, "heavy" and cooked for a long time, offered little variety. Meat, potatoes, flour and cabbage were bulwarks of the diet. The traditional Czech diet had a high-protein and high-starch content but included relatively few vegetables and fruits.

Although roast pork or fowl, dumplings, beer, cake and coffee appear for the Sunday dinner, the weekday dinner of the urban Czechs in America is distinctly American in tone. This is particularly true in homes where there are working women. Older housekeepers are more conservative. They make liver loaves, dumplings, pork with sweet and sour sauce, and still do much of their own baking, despite the excellence of the bought product. Caraway seeds are used for many dishes, such as sauerkraut; poppy seeds are used very often in baked goods; dill, dried mushrooms and, to a lesser extent, saffron are also favored spices.

Although the older people grew up without benefit of scientific infant care, the present generation of children all get milk, chopped vegetables, cod liver oil, and orange juice. Women of the Czech background group are exceptionally alert, interested, and cooperative in matters of

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health. They know how to follow directions given by physicians, nurses and nutritionists, yet there is a tendency to indulge their children in soda pop, coffee and beer in the belief that what is pleasurable should be denied no one. Milk, tomato juice, grapefruit juice and the like are still eyed with some diffidence by many adults.

In country districts here, the situation is somewhat different. The Czech housewife may grow her own poppies and use the seeds in baking. Wild plums are gathered and preserved, crocks of sauerkraut prepared, cabbages from the garden stored in the root cellar and rows of home-canned goods laid in for the winter. In some regions much of the garden truck is raised for market, but in general Czech women have taken over many characteristic American practices while retaining their own traditional activities. The rural Czech woman does much of her own baking, cooks enormous meals and although she entertains infrequently during the week, she feeds hordes of relatives and friends on Sundays.

Slovakia, under the influence of Hungary for centuries, presents a different culinary picture from that of Bohemia. The raw materials available to the Slovakians were more varied. Potatoes bulked even larger in their diet, but were never made into dumplings; most often they were eaten boiled. Instead of eating so much pork, the Slovaks ate more beef and, together with rye, they used wheat and corn meal for bread. Their diet in general was spicier, richer, more elaborate and included more green vegetables.

Although there are some Slovak farmers in America, they are less numerous than the Czechs. By and large they have given up their agricultural heritage to become American workingmen. In urban centers such as Cleveland, foods which were once seasonal can now be obtained throughout the larger part of the year. Stores in the neighborhood of mines and mills supply meat, white flour, potatoes and bread but do not carry the fresh buttermilk, cheese, fresh root vegetables or the fresh fruits and berries or other foods which were an integral part of the traditional Slovak diet. To this extent the Slovak diet in America has been greatly impoverished.

The two items most seriously lacking in the diet of both groups are milk and fresh vegetables. However, it would be no easy task to induce Czechs to alter their food habits to make up for these deficiencies as they do not like fluid milk or fruit juices. Few eggs are eaten but, in view of the large amounts of meat and animal organs used, this shortcoming is not alarming.

[For the lunch-box, soups made with milk and such vegetables as potatoes and carrots or Swiss chard are excellent; cole slaw, sauerkraut, or cucumbers dressed with sour cream, sandwiches of homemade liver loaf, or sausage, and tomatoes, lettuce, onions and radishes are acceptable foods. Fresh fruits in season and dried fruits are popular and easy to pack. Czechs are less cosmopolitan in their habits than the Slovaks and an intensive nutrition campaign may be necessary to achieve good results among this group.

No special techniques are necessary for the promotion of a nutrition campaign among Czechoslovakians. However, the emphasis should be rational and logical. The printed word enjoys greater prestige than the radio as a source of authority. When printed in the mother tongue, nutrition information will find a literate, if not always very responsive audience. Wherever possible, familiar foods which are especially nutritious (animal organs, for example) should be stressed. Although food is traditionally within her province, education of the woman alone would be insufficient to make a nutrition campaign effective, for despite her independence, the Czech or Slovak woman caters to the food preferences of her husband. The women are likely to accept such innovations as more fresh fruit, more green vegetables or more milk products only if they are asked to do so by their husbands. Consequently, nutrition education must reach the men; here again only an intellectual approach can be used to convince them of the necessity of changing from the familiar foods of their childhood.

Nutrition information taught to children in the schools is put into practice only for the youngsters in the homes. Whether from indifference or conservatism, it is difficult for the adults to change their food patterns. Consequently, to be effective, new ideas about food must be presented in positive, logical and definitely scientific, although simple terms addressed to the adults themselves, both men and women.

FOOD COSTS AND NUTRITIONAL STANDARDS IN PUBLIC INSTITUTIONS OF A LARGE CITY

In January 1943 the Community Service Committee of the St. Louis Dietetic Association, at the suggestion of Mrs. Mildred Frier, chairman, who is also home economics consultant, St. Louis Family Welfare Agency, undertook to study nutrition standards and food expenditures of children's institutions and homes for the aged in St. Louis, in an effort to determine standards which would be of assistance to the budget committees of the United Charities in evaluating budget requests from the institutions. The committee consisted of: Mrs. Theo Stebbins, Alexian Brothers Hospital, president, Missouri Dietetic Association; Ruth Kahn, Food Clinic, Barnes Hospital; Helene Knapp, Food Clinic, Fermin DesLoge Hospital; Flora Volle, volunteer dietitian, American Red Cross; and Betty McCorkle, Ralston Purina Company.

All children's institutions and homes for the aged of the city were asked to submit replies to questionnaires concerning the number of adults and children, the age distribution of children, and the actual menus served during one week. An over-all analysis of some of the principal weaknesses of the institutional menus was then made. (The food services at city institutions were not under the supervision of a trained dietitian or nutritionist.) Food duplication (same food or type of food served at a meal), color duplication (all-white or all-yellow meals), adequacy of evening meals for children, and use of the "basic 7" protective foods were some of the points considered in the analysis made from the material submitted. A brief critical statement was then made about each institution whose menus as submitted were sufficiently detailed as to lend themselves to analysis.

In general, it was found that most suppers were too light for the children and very monotonous. One supper was unvaryingly soup, bread and butter, and fruit; another, bread and butter, milk and jelly. Frankfurters on rolls served as the main supper dish more than once and also as the main dish of the main meal. Lack of sufficient citrus fruits and tomatoes was noted, also a lack of fresh vegetables. In some instances, only one orange a week was served. Fresh leafy green and yellow vegetables not only were scarce, but seldom served raw. Some "meatless meals" actually had no foods that could have substituted for meat except the milk served as a beverage. Certain institutions restricted eggs to adults; none were served to the children.

An approximate yearly food budget for institutions was drawn up, based on the yardstick of good nutrition, and using food prices as of April 1943, as follows: child under 4, $85; child 4 to 7, $95; child 7 to 9, $115; child 10 to 13, $145; girl over 13, $160; boy over 13, $175; women at-

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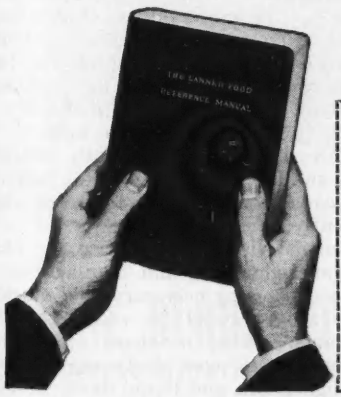

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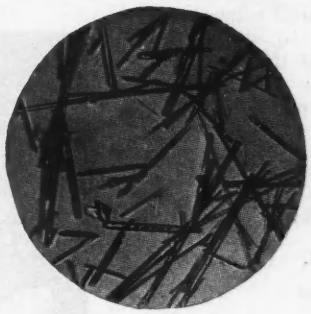

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tendants, $140; aged women, $130; men attendants, $150; aged men, $140. Estimates for each institution were compared with the actual food budgets for 1944. These figures, together with the critical statements, were sent to each institution which had submitted replies to questionnaires. Mrs. Frier commented, "The one great need as I see it is to plan meals by the week and have a standard to check them by. I am convinced that if this were done, there would be far fewer poor menus and more nutritious foods would be served." A mimeographed score sheet for checking menus was accordingly prepared, based on the 7 groups of food listed for the nutrition yardstick.

All persons concerned with or responsible for food purchasing or budgeting, menu planning, or food preparation for the institutions were invited to attend a conference at which Mrs. Frier presented a full summary of the study, pointed out the strengths and weaknesses of the menus submitted, and offered a number of practical suggestions for discussion. They were also invited to attend the course on Nutrition Needs of Children at the St. Louis University School of Social Service, July 12–30, where practical problems concerning institutional meals and food budgets were discussed.

Nutrition and the War

THE APPRENTICE DIETITIAN IN AN ARMY STATION HOSPITAL[1]

BERYL BIRKLAND

As the first apprentice dietitian to finish training at the Station Hospital, Fort Leonard Wood, Missouri, I would like to mention some of the more interesting features of the course.

A student dietitian who has had at least 6 months' training in a hospital course which is approved by the American Dietetic Association may be appointed to certain Army station or general hospitals as an apprentice. Major Helen C. Burns, Director of Dietitians, A. U. S., receives all applications and selects appointees from the U. S. Civil Service list of eligibles.

Under the competent supervision of the staff of Army dietitians at Fort Leonard Wood, the apprentice is assigned successively to each of the following services: Food Cost and Ordering, Officers' Mess, Detachment Mess, Ambulatory Patients' Mess, Bed Patients' Mess, and Special Diet Mess. Special problems are assigned on the completion of each service and an efficiency record submitted to the Director of Training Programs in the Office of the Surgeon General.

The duties of the apprentice dietitian in the different messes offer a variety of experiences. In the Special Diet Mess she becomes familiar with food service to special diet patients and receives training in the planning and supervising of the preparation and service of these trays to ambulatory patients as well as bed patients on the wards. Frequent visits by the therapeutic dietitian and the apprentice dietitian serve to win the cooperation of the patient who is more likely to adhere to his diet if the reason for doing so is made clear.

The apprentice directs the work of the Army cooks who are assigned to the Special Diet Mess of overseas hospital units in training at the Station Hospital. Special problems assigned on this service include: 5 case studies; the teaching of 4 ulcer classes and 4 diabetic classes for the patients; a protein, vitamin, and mineral analysis and cost study of 3-day, high-caloric, final-ulcer, reduction, and diabetic diets; standardization of 20 special diet recipes; the outlining of a work schedule for the special diet cooks. While on this service, the apprentice writes approximately 2000 special diets. She also instructs patients prior to their discharge from the hospital, and may be called to the Attending Surgeon's Office to give diet instructions to clinic patients. A summary of the special diets served, as well as the number and type of discharge diet instruction given, is tabulated in a special diet notebook.

In the Bed Patients' Mess, the apprentice dietitian, under the instruction of the staff dietitian, is responsible for all food going to the 55 hospital ward kitchens. She charts the food and staple supplies going to the wards, orders fresh fruits, vegetables, and staple goods. She

LIEUT. MARY STREIDL, CHIEF DIETITIAN, FT. LEONARD WOOD STATION HOSPITAL, MISSOURI, PINNING THE BARS ON LIEUT. BERYL BIRKLAND

instructs the head cook, supervises the preparation of food, checks daily requisitions, supplies the recipes needed, and takes inventories of the refrigerators. Leftovers are incorporated into the following day's menu or sent to another mess for immediate use. She orders the baked goods and directs the work of the bakers, as all baking is done in this mess at night. On the staff dietitian's day off, the apprentice is in full charge of the kitchen. By the end of the service, having been carefully instructed as to her own duties and the duties of the mess personnel, she should be fully capable of directing the mess routine smoothly and efficiently.

With this assignment she gains practice in making menus for the regular, light, soft, and liquid diets. To test one's skill in incorporating necessary food nutrients, menus for 20 days are analyzed for calories, protein, vitamins, and minerals. Other problems are planning work schedules of employees, cost study on the above-mentioned regular, light, soft, and liquid diets, standard-

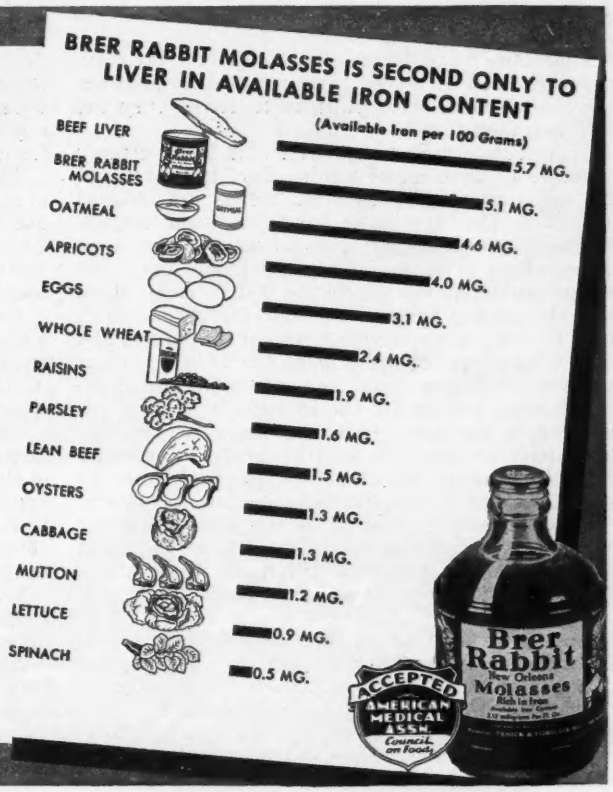
[1] This and the following paper have been passed for publication by the Bureau of Public Relations, War Department.

WHEN PATIENTS NEED IRON

AS THE CHART at right shows, Brer Rabbit New Orleans Molasses is second only to liver as a *food source* of available iron.

Three tablespoons of Brer Rabbit Molasses, added daily to the diet, supply about 3 mg. of available iron. The amount of molasses may be varied at your discretion. Penick & Ford, Ltd., Inc., New Orleans, La.

For a delightful drink rich in iron and calcium recommend: BRER RABBIT MILK SHAKE...made by adding 1 tablespoonful of Brer Rabbit Molasses to a glass of cold or warm milk. Three milk shakes a day are recommended.


BRER RABBIT MOLASSES IS SECOND ONLY TO LIVER IN AVAILABLE IRON CONTENT
(Available Iron per 100 Grams)
BEEF LIVER 5.7 MG.
BRER RABBIT MOLASSES 5.1 MG.
OATMEAL 4.6 MG.
APRICOTS 4.0 MG.
EGGS 3.1 MG.
WHOLE WHEAT 2.4 MG.
RAISINS 1.9 MG.
PARSLEY 1.6 MG.
LEAN BEEF 1.5 MG.
OYSTERS 1.3 MG.
CABBAGE 1.3 MG.
MUTTON 1.2 MG.
LETTUCE 0.9 MG.
SPINACH 0.5 MG.
ACCEPTED AMERICAN MEDICAL ASSN. Council on Foods
Brer Rabbit New Orleans Molasses

No. 959 Roaster and Double Baker Oven

THE
G. S. BLODGETT CO. INC.
53 MAPLE STREET BURLINGTON, VT.

STRETCH HARD TO GET FOODS WITH NEW BLODGETT EQUIPMENT

One fact emerges from the nations critical food supply situation—scarce foods will grow still scarcer.

Hence across the country those confronted with mass feeding problems are turning to oven cooking as a means of reducing spoilage and shrinkage and of providing more varied and palatable leftovers.

Thanks to quality and quantity output, low operating cost and long life, more and more experts are specifying Blodgett roasting and baking ovens.

ization of recipes, ward rounds, and cost studies on 10 items prepared by the bakers.

The apprentice makes ward rounds to observe the manner in which food is served, making corrections when necessary. She talks with patients to see if they are satisfied with their trays.

In the Ambulatory Patients' Mess it is the dietitian's duty to serve a "three square meals a day" type of menu. Variety and nutritionally balanced menus are stressed continuously. The apprentice dietitian soon realizes which foods are unpopular and substitutes the more favored selections to fill the daily food requirements. Her duties here are similar to those in the Bed Patients' Mess, namely, the proper preparation and serving of food, checking of food waste, standardization of recipes, and ordering of supplies. She also plans the 11 p.m. supper menu served to officers, nurses, and enlisted men on night duty. All meat cutting for the patients is done in the butcher shop in this mess. The apprentice dietitian has an opportunity to learn how to order meat for the entire hospital, to supervise the meat cutting, and note the poundage to be sent to the different messes for preparation. Over 10,000 lb. meat is prepared for the patients weekly. The apprentice dietitian estimates the cost of each food order, thereby learning to keep within the ration allowance, for the Army mess has a budget to which it must strictly conform.

The apprentice dietitian in the Officers' Mess has an excellent opportunity to supervise and plan the preparation of a greater variety of dishes. Under the supervision of a staff dietitian she checks food carts going to officer patient wards, writes menus, prepares food cost accounts, supervises the work of the baker and meat cutter, orders food from the commissary and, through authoritative purchase, from outside grocers. She assists in the planning of any special dinners. Problems on this service consist of the standardization of recipes, study of the floor plan of the mess, waste studies, and making out work schedules for the personnel.

The Detachment Mess serves all enlisted personnel of the Medical Corps. The duties here are similar to those in the Officers' Mess except that additions to the menu are necessary in order to provide meals suitable for men engaged in more active work.

Problems assigned in the Ambulatory and Detachment Messes are much like those in the Bed Patients' Mess. An interesting assignment is the actual cutting of meat with the meat cutters and figuring the percentage waste on the different cuts. Other problems include waste studies on edible garbage, food cost per person per meal for 3 days, work schedules for night personnel and bakers, standardization of recipes from actual cooking, and diagrams of service lines.

It is important that the apprentice dietitian fully understands the duties assigned the mess sergeant. These are not to be infringed upon, if one wishes his cooperation and confidence.

Apprentice dietitians' classes in Army administration, medicine, and diet therapy are held every weekday. One class each week comprises a discussion and criticism of the menus planned for the immediate future. The lecture course covers 19 weeks and is very thorough. The diet therapy lectures are given by graduate dietitians and doctors of the staff; medical lectures, by doctors prominent in the field of medicine related to the particular diet being discussed; while lectures in Army administration are given by officers of the Medical Administrative Corps.

The apprentice is on duty 8 hours a day, 6 days a week, in addition to class hours. She must observe the rules of the Medical Department Dietitians and the Army Nurse Corps, as she lives in the same quarters which adjoin the hospital. One unit consists of approximately 22 rooms with 2 baths and a living room. A typical room is equipped with a dresser, single bed, desk table, waste-paper basket, closet, lamp for indirect lighting, and a small rug. Various sports and social events provide recreation for leisure hours.

The most suitable clothing consists of: 3 off-duty afternoon and evening dresses with the necessary accessories; one wool suit; one slack suit; one off-duty wash dress; 2 pairs of pajamas; a housecoat and slippers; shower cap; sports, dress, play, and 2 pairs of white shoes; white hosiery and slips.

For convenience it is well to include in the foot-locker a towel rack, soap, wash cloths, shoe bag, 2 curtain rods, a bedspread, dresser scarf, an iron and 2 dozen coat hangers. A standard Army foot-locker is useful for there is little space for storage in your room.

Upon completion of the course, the apprentice receives a final physical examination, and upon the recommendation of the head dietitian and the Commanding Officer she is appointed Medical Department Dietitian, Army of the United States, with the rank of second lieutenant. Her official uniform is the same as that of the Army Nurse Corps, except for the insignia.

While the training is thorough and arduous, it is well worth the effort, not only for the opportunity which it affords for service to the country but also from the point of view of professional advancement. It is my earnest hope that each of the incoming apprentice dietitians will enjoy the course as much as I have.

THE ADVANTAGES TO THE DIETITIAN OF ARMY HOSPITAL TRAINING

AILEEN HOLZ

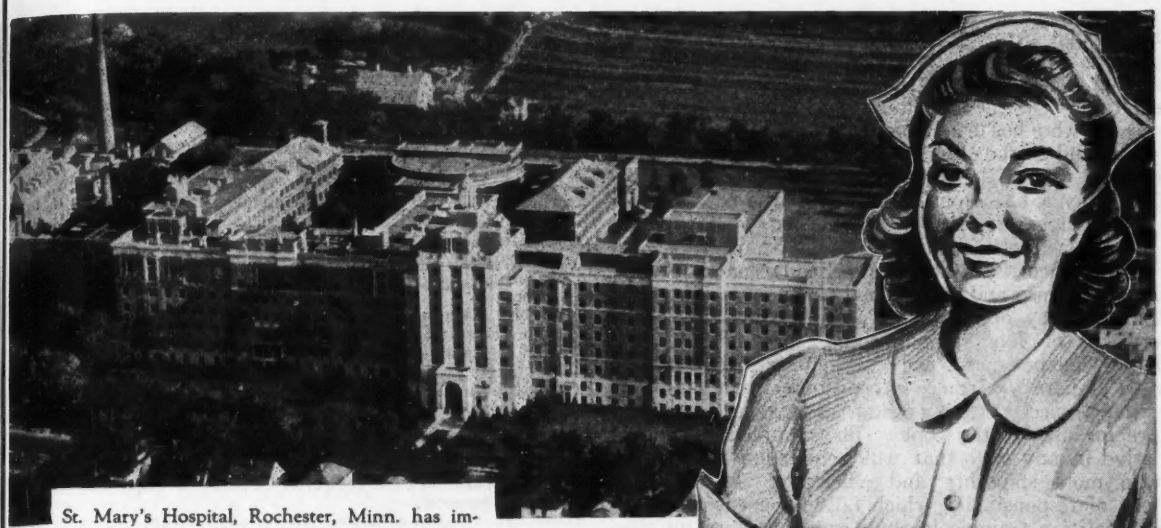
An explanation of the value of Army Dietitian Apprentice Training should be of considerable interest to the student dietitian or the college student now contemplating internship. It is important for those who intend to apply for a commission in the Army at the end of training in an approved civilian hospital to be conversant with the advantages of 6 months' training in a civilian hospital, plus 6 months' training in an Army hospital, instead of the former plan.

Just as Army and civilian life differ in many respects, so the duties and responsibilities of the Army dietitian differ from those in the civilian hospital. The period of adjustment, or indoctrination in Army ways, is important to the dietitian's future as an officer, as well as to her own personal welfare. During the apprentice training period she learns what is expected of an Army officer, the Army way of life, and the intricacies of Army ethics and etiquette.

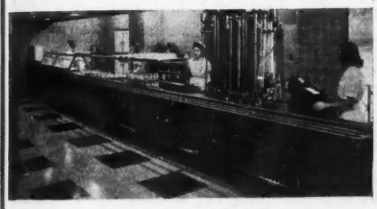
In the Army, the dietitian will find she has to work with cooks of a type entirely different from that in most civilian hospitals. She must learn to work and cooperate with these men, and realize that most of them had never cooked before they entered the Army and may be doing work quite foreign to their civilian mode of life.

She must learn that her responsibilities are mainly concerned with food ordering, preparation and distribution, supervision, special diets, and menu making. The mess sergeant is usually responsible for the cleanliness of the kitchen and for problems regarding management of personnel. However, the staff dietitian may direct or assist the sergeant in these duties. Above all, the Army dietitian must learn to work with and *through* her mess sergeant, rather than by detouring *around* him.

There is no better means of learning the best way to prepare and serve food to persons with varied food habits

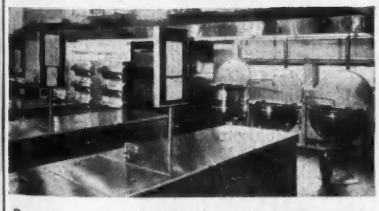


St. Mary's Hospital, Rochester, Minn. has improved its food service, eliminated food waste and reduced kitchen operating costs with a "*Custom-Bilt by Southern*" *simplified-centralized* kitchen.

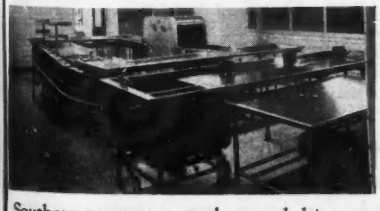


Sanitation supplements efficiency in this all electric, automatically controlled counter.

Moving belt tray conveyor speeds foods from serving units to dumb waiters.

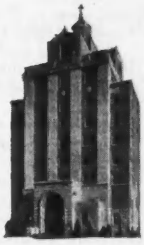


Roasting ovens, kettles, steamers, etc. are designed to improve food—reduce labor.



Southern conveyors, washers and driers are marvels of efficiency.

"Custom-Bilt by SOUTHERN" SIMPLIFIED-CENTRALIZED KITCHEN Saves STEPS·FOOD·MONEY



The New Medical Unit of St. Mary's Hospital, Rochester, Minnesota, now serves eight floors of patients' rooms, several dining rooms and cafeterias from a SINGLE Southern-designed *simplified-centralized kitchen.* Centralized dietetic supervision. Food service improved 60%. Food waste reduced . . . important savings effected in operating costs.

Southern *simplified-centralized kitchens,* available to hospitals at present under War Production Board restrictions, offer an important improvement in culinary service. We are making complete kitchen installations for Uncle Sam on war contracts —doing a 100% complete job from start to finish in our own plant.

We'll be glad to help you plan a *simplified-centralized kitchen* especially designed for utility, sanitation and compactness. A "*Custom-Bilt by Southern*" installation adds to efficiency—subtracts from operating costs. We invite your inquiries.

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than through Army apprentice training. The Army hospital patients come from all over the United States, and the problem of keeping them well fed and contented is a real task. On the one hand we have the boy from Tennessee who has existed on corn-pone and sidepork for years, and on the other, the New Englander who can't understand why we don't have pie for breakfast.

The Army is accomplishing much in the education of the soldiers regarding food. During her training period the apprentice dietitian has many opportunities to teach the enlisted men the value of proper nutrition in relation to physical fitness and general well-being.

A great many opportunities are afforded, too, in the supervising of food preparation. Since many Army cooks are inexperienced, she can help by teaching them how to prepare food more expeditiously and palatably. She receives special training in standardizing large quantity recipes for use by the cooks. She is urged to use her initiative in any way that will help make the kitchen operate more smoothly and efficiently. In fact, the amount of responsibility which falls upon the shoulders of the dietitian training in the Army is far greater than that of the student dietitian in a civilian hospital, but this should make her a more capable officer when she is commissioned. In some instances, the apprentice, if she has proved herself dependable, may replace a staff dietitian in an emergency.

Life in the Army is pleasant indeed for the apprentice dietitian. She will find Army social life and her "off-duty" hours most enjoyable. While training she receives a stipulated salary from the Civil Service Commission in addition to her quarters, subsistence and laundry.

These are but a few of the many advantages of the Army Apprentice Training Plan. Undoubtedly it provides an excellent opportunity to aid your country in the war effort, and at the same time it offers the finest possible training for the ambitious young dietitian.

MEDICAL DEPARTMENT DIETITIANS APPOINTED IN AUGUST 1943

According to recent instructions, it is no longer possible to list the post of duty to which Army dietitians are assigned. This list of August appointments, therefore, includes information in the following order: the name; the college or institution from which academic degree was received; and the civilian or Army hospital at which training was received. Appointees for whom no training course is listed have been accepted on the basis of "qualified experience." The total of 100 appointments for the month of August shows a very favorable increase over the preceding months.

Agnich, Theresa Marie: University of Minnesota; Harper Hospital.
Alban, Mary Alice: Ohio State University; Charlotte Memorial Hospital, N. C.
Anderson, Mary Arrington: Woman's College, University of N. Carolina; Duke University Hospital.
Arnold, Norma Ruth: Ohio University; Christ Hospital, Cincinnati.
Ashford, Olive Irene: University of New Hampshire; Massachusetts General Hospital.
Baker, Anita: Alabama Polytechnic Institute.
Becker, Beryl Genevieve: Iowa State College; Latter-Day Saints Hospital, Utah.
Beckman, Katherine Ann: University of Oklahoma; Walter Reed General Hospital, Hammond General Hospital, Calif.
Bemmels, Murlies Arlene: University of Minnesota; Johns Hopkins Hospital.
Bier, C. Margaret: St. Mary-of-the-Woods, Indiana; Walter Reed General Hospital.
Bodal, Ella Regina: University of North Dakota; Christ Hospital, Cincinnati.
Bonney, Mary Elizabeth: College of St. Elizabeth, N. J.
Breger, Shirley Diana: Hunter College, New York.
Brennan, Grace Margaret: Marywood College, Pennsylvania.
Brockbank, Patricia: Miami University, Ohio; Henry Ford Hospital.
Brown, Kathryn Elizabeth: Cornell University; Pennsylvania Hospital.
Buckley, Ann Hamilton: St. Joseph's College, Maryland.
Bullock, Margaret Elaine: Oklahoma A. & M.; St. Mary's Hospital, Minn.
Burbank, Barbara: Iowa State College; University of Minnesota Hospitals.
Burkman, Katherine Lorraine: Iowa State College; Michael Reese Hospital.
Buza, Annette Louise: Marywood College; Hahnemann Hospital, Penn.
Campbell, Elizabeth McClurkin: University of Alabama; Montefiore Hospital, N. Y.
Carion, Suzanne: Framingham State Teachers College; Massachusetts General Hospital.
Carlson, Olive C.: University of North Dakota; Seattle Course for Student Dietitians.
Carter, Mary Margaret: Texas Technological College.
Chase, Anna Marguerite: University of Nebraska; Walter Reed General Hospital and Bushnell General Hospital, Utah.
Chodos, Muriel M.: University of Connecticut; Walter Reed General Hospital.
Cockburn, Constance Leslie: Iowa State College.
Cohen, Shirley Alberta: New York University.
Cox, Donetta: Utah State Agricultural College.
Craigie, Hazel Barbara: Montana State College; Milwaukee County Institutions.
David, Ruby Darleen: North Texas State Teachers College.
DeWees, Sarah Frances: Ohio State University; Pennsylvania Hospital.
Dewey, Dorothy Hope: Cornell University; Grasslands Hospital.
Dickinson, Helen Jean: Buffalo State Teachers College.
Evans, Dorothy Ann: Butler University, Indiana; Henry Ford Hospital.
Fitch, Ruth Cleo: University of New Hampshire.
Folgate, Rosemary Frances: Iowa State College; Henry Ford Hospital.
Fowler, Sina Faye: Kansas State College; Michael Reese Hospital.
Frolich, Louise Augusta K.: University of Nebraska; Henry Ford Hospital.
Frost, Jeanne E.: Ohio University; Michael Reese Hospital.
Gillson, Helen Jo: Ohio State University; Walter Reed General Hospital and Lawson General Hospital, Ga.
Glicksman, Helen Ronnie: New York University.
Gordon, Esther Elizabeth: College of Medical Evangelists, California.
Greene, Shirley G.: West Virginia University; Walter Reed General Hospital and Lawson General Hospital, Ga.
Hanratty, Alice Cecilia: St. Benedict College, Minnesota; Milwaukee County Institutions.
Harman, Thelma Alta: Kansas State College; University of Minnesota Hospitals.
Harrison, Louisa Bell: Ohio State University; Starling-Loving University Hospital, Ohio.
Heim, Dolores M.: St. Benedict College, Minnesota; Edward J. Meyer Hospital, N. Y., and S. H. Ft. Leonard Wood, Mo.
Heins, Dorothy Anne: Iowa State College; Grasslands Hospital.
Hessburg, Helen Mary: Mount Mary College, Wisconsin; University of Minnesota Hospitals.
Hilfiker, Joyce Elaine: University of Idaho; Montefiore Hospital, N. Y.
Holz, Aileen Margaret: Pennsylvania State College; Mt. Sinai Hospital, Penn.; and S. H. Ft. Leonard Wood, Mo.
Hornbaker, Dawn Lorraine: Kansas State College; Indiana University Medical Center.
Jackson, Catherine Margaret: Michigan State College; Michael Reese Hospital.
Jones, Harriet Taylor: Milwaukee-Downer College; Stanford and Lane University Hospital, Calif.
Kaiser, Dorothy Mary: University of California.
King, Margaret: University of Alabama; Vanderbilt University Hospital.
Klimesh, Marcella Edna: University of Minnesota; Milwaukee County Institutions.
Koch, Leona Frances: St. Joseph's College, Maryland.
Ledbetter, Ruby Elizabeth: University of Arizona; Michael Reese Hospital
MacRae, Dorothy Margaret: Battle Creek College; Harper Hospital.
Malery, Marjorie Virginia: Howard University; Freedmen's Hospital.
Marston, Helen Virginia: Madison College, Virginia; Watts Hospital, N. C.

THE CASE FOR NATURAL OATMEAL'S PROTEIN AND VITAMIN B_1

WHOLE-GRAIN oatmeal leads all natural cereals—not only in protein but in Vitamin B_1!

Cereal protein and vitamin B_1 are seriously denatured and depleted by processes so often used in making corn, wheat, rice and part-oat grain cereals. Such processes are not used in making Quaker Oats. It is obvious that any "restored" cereal can only imitate and never equal Quaker Oats.

With the nation facing a shortage of high-protein foods, it becomes doubly important that whole-grain oatmeal is recommended. *Its protein content cannot be matched by rice, wheat, or corn in either quantity or quality.*

THE QUAKER OATS COMPANY

Mathes, Margaret Stevens: Purdue University; Harper Hospital.
McClave, Harriet Bluebell: Colorado State College; Alameda County Course.
McClelland, Esther Louise: Pennsylvania State College.
McCracken, Gladys G.: Carnegie Institute of Technology.
Ogden, Mary Grace: Michigan State College; Michael Reese Hospital.
Pabst, Martha Louise: Purdue University; University Hospital, Cleveland.
Pannier, Marion Jayne: Kent State University, Ohio.
Pollin, Natalie Irma: New York University.
Raff, Eleanor Alice: San José State College, California; Stanford University Hospital.
Rajkowski, Rosemary K.: College of St. Benedict, Minnesota; Walter Reed General Hospital.
Ramsey, Ruth Arline: Kansas State College; Walter Reed General Hospital and Hammond General Hospital.
Reynolds, Helen Sue: Buffalo State Teachers College.
Russell, Mildred: University of Texas.
Saluri, Mary Aimone: Seton Hill College, Pennsylvania; Iowa University Hospitals.
Sather, Marion Ruth: St. Olaf College, Minnesota; Walter Reed General Hospital and Lovell General Hospital, Ft. Devens.
Schenk, Grace Mina: Buffalo State Teachers College; Buffalo City Hospital, N. Y.
Sherwood, Mary Abbie: University of Missouri; Barnes Hospital, Mo.
Shuman, Eleanor Clare: Florida State College for Women; University Hospital, Cleveland.
Sims, Jane Foliart: University of Texas.
Slanina, Marcella Lois: St. Mary-of-the-Woods College, Indiana; St. Louis University Hospital.
Sleddon, Barbara Marion: Otago University, New Zealand; Michael Reese Hospital.
Smith, Marguerite Lenore: Illinois Institute of Technology; Cook County Hospital.
Soule, Thelma Elaine: University of Washington; Seattle Course for Student Dietitians.
Spencer, Virginia Deloras: University of Missouri; Walter Reed General Hospital and Camp Campbell, Ky.
Stanley, Elise Topliff: Simmons College; Presbyterian Hospital, N. Y.
Stevens, Lelia Etoile: University of Wisconsin; Lakeside Hospital, Ohio.
Stiles, Mary Katherine: University of Washington; University of Michigan Hospital.
Teeter, Vivian Zoe: Oklahoma A. & M. College; University of Oklahoma Hospital.
Tidd, Caroline Elizabeth: Elmira College, N. Y.
Tilley, Mary Frances: Iowa State College; Massachusetts General Hospital.
Triplett, Mary Arther: College of William and Mary; University of Maryland Hospital.
Walker, Georgia Lucille: Purdue University; Massachusetts General Hospital.
Weidlein, Wilma: Iowa State College; Beth Israel Hospital, Mass.
Whitehead, Margaret: University of Kansas; Walter Reed General Hospital.
Wood, Mary Josephine: St. Joseph's College, Maryland; St. Mary's Hospital, Mich.
Zendzian, Wanda Julia: Framingham State Teachers College.

Emergency Rations for Canada's Fighting Men

"Calorie deficiency in rations is a very important cause of deterioration in the morale and performance of trained soldiers," say nutrition experts of the Canadian Army. The statement explains why the Canadian Army has developed an emergency field ration, to be carried by soldiers in their kits, which will provide 3750 calories of food value per day, more than the average person requires for hard work.

The food rations in the RCAF bandolier kit are specially prepared biscuits of soft wheat flour, whole wheat flour, hydrogenated peanut oil as vegetable shortening, skim milk powder, sugar and salt; a special formula chocolate bar; and chewing gum. The half-ounce biscuits have a caloric value of 100, the chocolate bar, 137 calories per ounce. All three items are packed and sealed to withstand temperature changes from sub-zero to that in tropical zones, and to remain edible without rancidity for at least a year. In addition to this food ration, the bandolier kit contains fishing lines, bait and spinners to enable the men to supplement the food rations with fresh-caught fish.

The Canadian Army Mess Tin Ration contains for one day for one man tinned beef, pork and sardines, specially prepared biscuits, pasteurized cheese in wax-dipped carton, jam and butter in tins, pea soup powder, tea, coffee, skim milk sugar mixture, chocolate malted milk with skim milk and vitamins in packages, lump sugar, chocolate, hard candies, gum, salt, ascorbic acid in tablet form, cigarettes and matches. The kit weighs 2 lb. 15 oz., is contained in a wax-coated carton. Soldiers carry a 2-pt. water bottle.

Strenuous tests by men on long marches and camping trips who lived entirely on this daily ration, show that it is adequate to maintain men under conditions of extreme exertion for a period of 9 days without loss of weight or efficiency. Nutritionists report that "trained Army men previously nourished on standard Army rations did not experience significant symptoms during the tests on a 3750 calorie per day ration relatively deficient in some of the members of the B complex vitamins." Canadian soldiers reported that they could live for a month or longer on these daily rations without ill effect.

The Royal Canadian Air Force has a somewhat similar ration, called a basic aircraft ration. It is included in emergency equipment carried by all aircraft, is used also in airdropped rescue gear to shipwrecked sailors and airmen. The ration is contained in a wax-coated cardboard box weighing 2 lb., filled, has food value of 2447 calories, and consists of three 2-oz. packages of specially prepared biscuits similar to those in the bandolier kit, a 3-oz. tin of pork, 1.9-oz. tin of butter, 1.5 oz. cheese, 1-oz. package of sugar and milk powder, 2-oz. specially prepared chocolate bar, 1-oz. package of pea soup powder, 5 sticks chewing gum, 20 lemon candies, 3 tea bags, a packet of salt, a cube of Bovril, a fat capsule, 6 cubes sugar, a 2-oz. fruit bar composed of compressed dried fruits including apricots, dates and raisins. Tests with this kit showed that all men using the kit found it favorable, that the ration gives a wide variety of food. The men found that one fat capsule, with Bovril and pea soup powder, was sufficient to make a good soup, that two fat capsules, originally in the kit, made the soup too greasy.

The Royal Canadian Navy emergency one-day one-man food ration consists of a small tin (which can also be used as a cup when empty, and to catch rainwater) which contains 12 concentrated biscuits, 12 chocolate ration tablets which are 70 per cent whole milk, and 2 bars of a specially prepared chocolate bar. The metal kits for liferafts contain 8 such boxes and eight 16-oz. tins of water as well as food packages of malted milk tablets and chewing gum. All these foods have been processed so that they would withstand very high temperatures without spoiling. The chocolate bar will stand heat to 212° without melting, and the water can has been subjected to temperatures as low as 15° below zero without breaking. Because of the high caloric content of the concentrated foods, principal Navy instructions with the rations are to "eat slowly." Despite sterilization of these foods, they have been made palatable and tasty, a difficult feat in itself.—*R. F. MacLean, Publications Branch, Wartime Information Board, Ottawa, Ontario, Canada.*

The Nutrition Story of EXTENDO

A Timely, Practical Meat Extender!

Prepared from a carefully chosen group of ingredients that balance each other to produce a nutritious, usable product meriting your careful consideration.

Ingredients: Soya grits, stoneground wheat, steel cut oats, corn germ, wheat germ, hydrolyzed plant protein (an artificial flavoring), primary grown dried yeast, milk powder and seasonings.

***ESSENTIAL NUTRIENTS FOUND**
in 100 grams of EXTENDO

Determination	Values Found, per 100 gm.
Proximate Analyses	
Total solids	90.4 gm.
Moisture	9.6 "
Ash	13.6 "
Protein	31.1 "
Fat	5.8 "
Crude Fiber	2.1 "
Carbohydrate	37.7 "
Caloric values	327 calories
Vitamin Analyses	
Thiamine	3.72 mg.
Riboflavin	0.87 "
Niacin	4.79 "
Pyridoxine	0.48 "
Pantothenic Acid	2.84 "
Mineral Analyses	
Calcium	240 mg.
Phosphorus	590 "
Iron	9.2 "

* All values given are from Food Research Laboratories

EXTENDO is a practical, easy-to-use meat extender. It combines quickly and easily with various meats, such as beef, veal, lamb, or pork to make appetizing, nutritious meat loaves that slice equally well hot or cold. In terms of real economy, remember that ¾ pound of meat can be extended with ¼ pound of EXTENDO and ½ pound of liquid (water, broth or milk) to produce 1½ pounds of meat mixture for meat loaves or meat patties. At the added cost of only ¼ pound of EXTENDO the original ¾ pound of meat has been extended 100%.

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Book Reviews

The Science of Nutrition. By Henry C. Sherman, Ph.D., D.Sc., Mitchill Professor of Chemistry, Columbia University. New York: Columbia University Press, 1943. Cloth. Pp. 253. Price $2.75.

Dr. Sherman describes his most recent book thus: "As contrasted with a textbook or reference handbook, this might be called a book *about* nutrition rather than *in* the science. Technical terms are reduced to a minimum and no specific training in science is demanded of the reader. Yet somewhat more of scientific curiosity and of intelligent appreciation of accuracy and adequacy are presupposed than in the primer-like books of which so many have been published recently."

The general purpose is to summarize and evaluate the present status of nutrition as concisely and impersonally as possible. The opening chapter leads off with a modernized version of the definition of food and a discussion of the modern view of food and nutrition. Other chapters, concerned with discussions of food as fuel, as the "materials of bodily structure" and the vitamins, include sufficient historical background to awaken interest and a better understanding of the basic principles of nutritional science.

Dietitians will be especially interested in the chapter entitled "How the Body Manages Its Nutrition Resources." Mechanical analogies are no longer completely adequate in describing the operation of the body in which "we have a kind and degree of self-acceleration quite beyond anything that machine models have or can adequately represent." Dr. Sherman gives considerable space to the Schoenheimer school of thought concerning the dynamic state of body constituents.

The more immediately practical applications of modern nutritional science are given the attention one might expect in a book by Dr. Sherman. He discusses the four rather widely accepted plans for dividing the family food money; outlines a national nutrition policy based on international relations and the view ahead; and closes with a scientific critique of our chances for a "higher health and longer life." In short, he believes that we accept too readily the belief that the original chromosomal endowment is the best explanation of a superior life history. Instead we should accept as "a practicable opportunity" the fact that "conscious chemical control and improvement of one's internal environment through one's nutrition habits" is now a workable proposition.

Essentials of Industrial Health. By C. O. Sappington, M.D., Dr. P.H. Philadelphia: J. B. Lippincott Company. Cloth. Illustrated. Pp. 626. Price $6.50.

According to the Preface, this book closely follows a recently proposed course for undergraduates in medical schools and is intended as a text for such a course. The content is based in part on a joint report of the Committee on Medical Education of the American Association of Industrial Physicians and Surgeons and the Council on Industrial Health of the American Medical Association (published jointly by *Industrial Medicine* March 1942 and the *Journal* of the American Medical Association February 28, 1942).

The role of nutrition in industry is included in the chapter, "Personal Hygiene for Workers." The importance of nutrition surveys and their proper interpretation, as well as the scientific application of nutrition principles, are stressed. As in other sections of the book, authorities are freely quoted. While there is little that is new to the dietitian in the material on nutrition of industrial workers, the book contains information in compact form on topics related to her administrative responsibilities. For example, in the chapter, "Industrial Health Exposures," the effects of exposure to defective illumination, dust, heat, dampness, sudden changes of temperature, muscular strain, etc., on physical health are reviewed and the symptoms, conditions, or diseases to look for in identifying the effects of such exposure are listed. Also, there is an excellent summary of recent studies and conclusions regarding "fatigue control." Dr. Eugene Lyman Fisk's questions in this connection are quoted as follows: "(1) Does the output fall because the worker is tired, or because he is physically deficient? (2) Is the worker ill because he is tired, or tired because he is ill?" These questions, according to Dr. Sappington, can be answered only by adequate and long-continued study of individual cases with due consideration of the many factors which operate to produce fatigue. Many such factors are then discussed, among them, "speed-up" in connection with the war effort, long hours, social and emotional factors. From the results of two studies it was concluded that psychologic and environmental factors are far more important causes of fatigue than physiologic factors and that "as long as workers were made to feel important and essential and were also able freely to communicate their work reactions to fellow employees and especially to the supervisors and executives, they produced the maximum in quantity and quality." Dr. Sappington states: "The physical manifestations of fatigue which are now recognized include ill health, accident proneness, and inefficiency at work. Wherever these conditions are found, therefore, undue fatigue should be suspected and the workers properly examined."

In a section on women in industry, there is a discussion of the proneness of women to fatigue as compared with men and a "day-in-and-day-out" program for health maintenance of women employees. Some general recommendations for the care of pregnant women workers are offered. State laws applicable to the employment of women are briefly summarized, and suggestions for the selection of workers for night shifts are discussed. A description of the special physical defects and disabilities to which executives are susceptible, especially when working under the pressure of present-day conditions, is interesting and enlightening. The danger of overtaxed minds and bodies is emphasized, and one writer is quoted as saying, "If the job ahead is left to those whose cerebral arteries and decrepit bodies have long outlived their usefulness, centuries will have passed before we recover from this debacle, if perchance we ever do."

The sections on noise control, illumination, personal service conveniences, and sanitation contain information and suggestions useful in any establishment where numerous workers are employed. In fact, the book as a whole can be highly recommended for use by graduate and undergraduate administrative dietitians as a reference and source book on the practical application of preventive medicine and public health.

A Guide to Practical Nutrition. Edited by Michael G. Wohl, M.D., and John H. Willard, M.D., with an Introduction by Morris Fishbein, M.D. Published by the Philadelphia County Medical Society, 1943. Paper. Pp. 98.

This is a series of articles on nutrition, sponsored by the Committee on Nutrition and Deficiency Diseases of the Philadelphia County Medical Society, which has been reprinted from *Philadelphia Medicine*, 1941–42. In the Preface, Dr. Wohl states that the physician must engage in education of the public in nutrition. "Here and there lay groups have undertaken this but they can educate only generally and . . . without genuine authority." Dr. Fishbein, in his Introduction, comments "Until adequate knowledge of deficiency diseases and scientific nutrition becomes the common property of all members of the medical profession, the utmost that can be realized in this field will not be accomplished."

The incidence of deficiency diseases and protein requirements, including the intravenous use of protein hydrolysates, are discussed in the first chapter followed by one on carbohydrates, both by Dr. Wohl. Chapters on fat metabolism and minerals in human nutrition authored by physicians are followed by one on "everyday diets" by Sister Maude Behrman, a dietitian. Other chapters include diet in pregnancy, nutrition in childhood and in the older individual, as well as discussions of the vitamin deficiencies, the vitamin B complex, riboflavin, nutritional aspects of dental disease, nutrition as a problem of war and public health, and an appendix (vitamin charts, etc.), cross index, and bibliography.

Obviously this compilation should help materially to aid the physician in meeting the need for educating the public in nutrition, a task which in the words of Dr. Wohl, must be supervised by medical authority.

A recent communication from Dr. Wohl states that through the kindness of John Wyeth and Brother, Inc., who subsidized the printing of the book, it was possible to distribute 35,000 copies free to physicians in Pennsylvania and neighboring states and to other physicians throughout the country who requested copies, but that the supply has now been completely exhausted.

Nutrition and Physical Fitness. By L. Jean Bogert, Ph.D. Philadelphia: W. B. Saunders Company, 1943. Fourth edition. Cloth. Illustrated. Pp. 500. Price $3.

That this is now a successfully established practical textbook is evidenced by its having reached a fourth edition in a comparatively short space of time. In line with advancing knowledge the subject matter on minerals and vitamins has been expanded from two to six chapters, five of which are entirely new, and a new and more extensive table of the nutritive values of foods is included.

Many of the excellent features included in earlier editions, for instance the tabular arrangement entitled "Refuting Erroneous Ideas About Food," have been included. A short chapter on "Recent Trends in American Dietary Habits" (or the influence of

The Newer Concepts of Meat in Nutrition

Pork...

and its advantages in WARTIME MEALS

FOR the remainder of the war period, a goodly portion of the civilian meat supply will have to be pork. What does pork offer? Does it present any advantages for wartime meals?

In the uncooked state pork muscle meat contains approximately 16% protein (against an average of 18% in other meats), 35% fat (almost twice as much as the average in other meats), and 42% water (from 1/4 to 1/5 less than other meats).

The protein of pork is of high biologic value, and its fat is rich in the unsaturated fatty acids, by many investigators considered essential to human nutrition.

Its mineral content makes pork a good source of well-available iron and copper, as well as phosphorus.

Pork leads all meats in thiamine content. It also contributes nutritionally important amounts of riboflavin and niacin.

While its digestion is somewhat slower, due to its high fat content, its co-efficient of digestion is high—from 96% to 98%.

Under wartime curtailments pork is advantageous because it makes a high contribution to energy requirements as well as to those of many essential nutrients. Like all meats, it stimulates the appetite, thus increasing the consumption of other foods at mealtime, and is high in satiety value.

The prolonged postcibal satisfaction pork produces is doubly valuable in wartime when food availability is lessened.

ESSENTIAL NUTRIENTS IN PORK*

	Protein	Fat	Vit. A I. U.	Vit. D I. U.	Vit. C Ascorbic Acid mg.	Thiamine mg.	Riboflavin mg.	Niacin mg.
Muscle Meat	16%	35%				1.5	0.24	8.0
Heart	17.1%	4.8%			4.0	0.6	0.12	6.5
Kidney	15.5%	4.6%			14.0	0.5	1.96	10.0
Brain	11.7%	9.0%			18.0			
Tongue	16.8%	15.6%						
Liver	21.3%	4.8%	9,850	44.5	24.0	0.5	2.70	19.0

*Average values per 100 Gm. fresh substance
Based on Waisman and Elvehjem "The Vitamin Content of Meat"

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the industrial era upon diet) lends a nice perspective, even though some of the rules for bettering dietary habits, offered without further comment, such as "making breakfast a relatively light meal," might be misleading under certain conditions. Perhaps, too, in the light of a recently published discussion on ruminant nutrition, some of the conclusions concerning meat in the human dietary and those concerning the vegetarian diet, in the strict sense of the term, might be subject to modification. These minor criticisms, however, in the opinion of this reviewer, are amply counterbalanced by her sincere belief that Dr. Bogert's book is far more interestingly written and therefore much more useful than most other recent books with a like purpose. It unquestionably merits its wide acceptance.

Down-On-The-Farm Cook Book. By Helen Worth. New York: Greenberg, Publisher. Cloth. Pp. 322. Price $2.50.

For those who have longed to reproduce some of the simple, old-fashioned dishes that mother used to make or to taste the succulent goodness of farm dishes about which they have read in local-color stories, a mouth-watering experience is provided in this book of homely "receipts."

It may be opportune here to quote the *New Century Dictionary* on the etymology and use of the word "receipt": "[. . . from the Latin *recepta*, pp. of *recipere* 'to take.'] A formula or prescription of things taken to compound a medicine, a dish of food, or some other preparation; a recipe;" etc. The term, "recipe," in use today, is the imperative form of the same Latin root and, incidentally, is the word for which the script "R" at the head of medical prescription blanks stands.

The author has collected her material from every rustic corner of the nation and has undertaken the time-consuming task of ferreting out the actual amounts and methods used from formulas handed down by farm mother to farm daughter for generations, of testing these and setting them down in more or less orthodox fashion. The resulting directions are accurate enough to be easily followed, and the approximations given for time of cooking and probable number of servings are perhaps more exact than those given in some of the supposedly more "scientific" cook books.

Aunt Sleide, who is aptly quoted here and there throughout the book, says: "There isn't much call for appetizers on a farm. Our appetites come from digging and planting, cultivating and harvesting." Soups, accordingly, lead off, followed by meat, poultry, vegetables, etc., with desserts and confections bringing up the rear. The final chapters, on canning and preserving, will be especially nostalgic to some. Here the directions are properly precise and up to date, especially with regard to the use of the pressure cooker and the preparation and canning of meat. There are directions for making country sausage, green tomato marmalade, corn relish, etc., and even elderberry and dandelion wine and blackberry cordial. The index is complete and usable.

The Industrial Cafeteria and Restaurant Worker's Manual. By Milton A. Rosenfeld, Restaurant Management Consultant. Deep River, Conn.: National Foremen's Institute, Inc., 1943. Cloth. Pp. 107. Price $1.35.

This manual is another of the "how to do it" publications that are intended to help fill the need for speedy training in many industrial situations. It is designed to instruct the counter worker only, and is in no sense a cafeteria management discussion.

The chapters that deal with instruction lists for counter workers are well done in that they are simple, fairly inclusive, and concise. The chapters on cooking methods, cookery principles, and food values are, of course, out of place, for they do not cover in even elementary fashion the subjects named.

A busy cafeteria manager might find it useful to provide his workers with a copy of this manual. However, carefully set-up instruction sheets or standard procedures arrived at by the management for a specific situation will do as good a training job for the average worker.

Addendum to The Chemistry of the Amino Acids and Proteins. Edited by Carl L. A. Schmidt, M.S., Ph.D., Professor of Biochemistry and Dean of the College of Pharmacy, University of California. Springfield, Illinois: Charles C. Thomas. Cloth. Illustrated. Pp. 256. Price $5. (This Addendum also appears as a supplement to the second edition of *The Chemistry of the Amino Acids and Proteins*, price $10.)

The *Addendum* under review is presented so that the rapid and at times revolutionary progress in our knowledge of the subject since 1938 may be noted. Included is a list of corrections to the above-mentioned 1938 edition.

The numbering of the chapters follows that of the parent book and the sequence of the appended references to each chapter continues in numerical order. For instance a grand total of 612 references to the literature now follow chapter 1 on the constitution and synthesis of the amino acids, which is largely concerned with the technique of such determinations. In fact, the book on the whole is concerned with analytical and experimental methods in the research laboratory and therefore is of academic interest only to the medical clinician and practicing dietitian, except for the last two chapters which serve to bring up to date our knowledge of the relation of proteins to immunity and that of the role of proteins in nutrition. In line with currently accepted beliefs, H. L. Almquist, who authors the final chapter, has this to say: "It has frequently been stated that the amino acids are the 'building stones' from which proteins are made. This analogy leaves an impression of a static, permanent architecture which is not in accord with the newer information. Rather, the modern conception seems to be one of an extremely labile structure. The components of this structure are continually disappearing, reappearing, and changing into each other. The entire protein molecule, perhaps, may change into one of a different type, or function. The metabolism of the amino acids and the proteins probably cannot be described more specifically than as a 'swirl of metabolism' or a 'rapid metabolic merging of tissue and dietary components.' The classical concept of a separate 'exogenous' and 'endogenous' nitrogen metabolism, for example, may require a critical revaluation, since it is not readily adapted to the newer knowledge. . . . A good start has been made on the amino acid needs for maintenance. It is apparent that certain qualitative differences exist between growth and maintenance needs. . . . Information on the amino acid requirements for productive functions, such as milk secretion and egg laying, is extremely scanty. The relations of the amino acid composition of the diet to longevity and to reproduction are additional problems worthy of much attention. These aspects of amino acid requirements are becoming increasingly feasible for study, in so far as other accessory food factors, especially the vitamins, are being recognized and conveniently provided for in pure or non-protein-bearing forms.

"The fact that phosphoric acid and protein as well as certain of the vitamins are the components of coenzyme systems indicates that the first two play a role equally important to that of the vitamins. An adequate intake of all three is necessary for nutritional purposes."

Family Nutrition. Published by the Philadelphia Child Health Society, 311 South Juniper Street, Philadelphia, 1943. Second edition. Paper. Illustrated. Pp. 119. Price 50 cents.

This substantial booklet, which is based in part on some of the published findings of the Pennsylvania Mass Studies in Human Nutrition and other related studies, is, as before, presented under the auspices of a committee made up of physicians, a dentist, and two nutritionists, Mrs. Anna dePlanter Bowes and Dr. Pauline Beery Mack (*See* review in this JOURNAL for July 1942).

In the revision a few changes and additions have been made to bring the material up to date. A discussion of the dietary history has been added to the chapter on "Measuring Nutritional Status." A new chapter entitled "Menu Planning and Rationing" has also been added. Included is a table of the kinds and quantities of foods recommended annually for people of different sexes, ages and degrees of activity; a table on the "Nutrient Content, Ration Points, and Cost of Common Foods," prepared jointly by the Pennsylvania State Council of Defense, the Ellen H. Richards Institute, and the Philadelphia Child Health Society, which shows the energy, protein, mineral, and vitamin values of typical foods of the different food groups, with blank spaces in which ration value and cost can be listed; and for good measure a table showing the amount of different type vegetables that should be grown (and the length of the row necessary to produce these) in Victory Gardens to meet yearly food needs of the various members of the family.

Without doubt this is a most valuable and practical compilation, and should be a real boon to all those responsible for teaching family nutrition.

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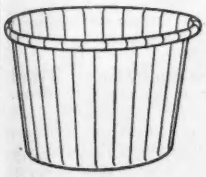

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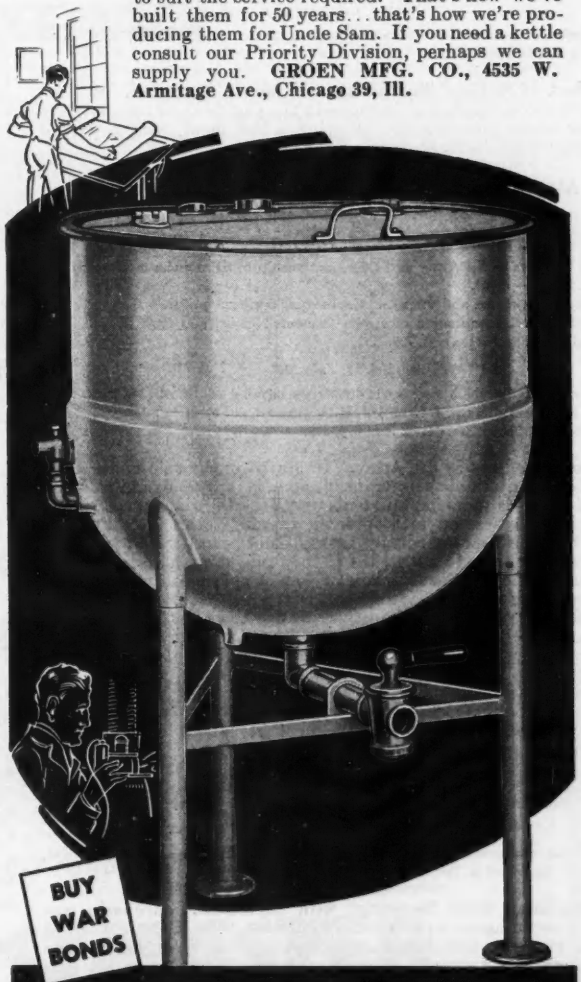

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Current Literature

Contributed by Helen Baughman, Janet Engebretsen and Hilda McEwen, Dietary Department, Johns Hopkins Hospital, Baltimore; Quindara Oliver Dodge, School of Home Economics, Simmons College, and Women's Educational and Industrial Union, Boston; and the Journal Staff.

AMERICAN JOURNAL OF THE MEDICAL SCIENCES

Vol. 206, July 1943

* The management of obesity with emphasis on appetite control. N. H. Colton, H. I. Segal, A. Steinberg, F. R. Shecter and N. Pastor.—p. 75.

Obesity and Appetite Control. Dietary restriction of intake is still the basic principle of weight reduction, but over a long period is difficult without aid of an appetite depressant. In 300 obese individuals subjected to appetite control, correction of eating habits, exercise and dehydration, and endocrine therapy (when indicated), dextrose, amphetamine sulfate, propadrine hydrochloride, digitalis and belladonna were frequently employed to help depress the appetite; one of these agents was administered an hour before a period of hunger. Patients were treated for 2 to 18 months with an average weight loss of 2 lb. per week.

AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 139, July 1943

* The effect of sodium bicarbonate on gastric secretion. W. L. Adams, C. S. Welch and B. B. Clark.—p. 356.

Effect of Sodium Bicarbonate on Gastric Secretion. Sodium bicarbonate produced an increase in the gastric secretory activity during hours immediately following a test meal, with a partial compensatory decrease during later hours.

AMERICAN JOURNAL OF PUBLIC HEALTH AND THE NATION'S HEALTH

Vol. 33, June 1943

* Food handlers in the Army and their relationship to Salmonella food poisoning. W. Stone.—p. 706.

Disinfection of dishes and utensils. Engineering section.—p. 722.

* Microbiological examination of spices, fermented foods, and fruit juices. Food and nutrition section.—p. 725.

Vol. 33, July 1943

Losses of vitamins which may occur during the cooking of dehydrated vegetables. F. Fenton, B. Barnes, J. C. Moyer, K. A. Wheeler and D. K. Tressler.—p. 799.

* The danger of botulism. I. C. Hall.—p. 818.

Food Handlers in the Army. In studying the role of the food handler in enteric disease transmission, 44 of 2000 examined were positive for Salmonella, and 5 positive for Shigella, two groups of organisms associated with epidemic disease outbreaks. Positive food handlers were generally asymptomatic and were associated with small epidemic outbreaks of food poisoning and diarrhea.

Examination of Foods. Most types of spices are very high in bacterial count and may thus contribute to the spoilage of foods in which they are used. Faulty salting or temperature of fermentation may cause improper acid development in fermented foods. In processing fruit juices control of quality is control of cleanliness and handling of food.

Botulism. Most outbreaks of botulism have been caused by improperly home-canned vegetables. With the current trend toward home canning emphasis must be placed on safeguards which are completely outlined in this article.

ANNALS OF INTERNAL MEDICINE

Vol. 19, July 1943

* Duplicate measurements of circulation time made with the saccharin method. K. H. Esser and K. Berliner.—p. 64.

Circulation Time Measured with Saccharin. Saccharin was chosen as an agent to measure circulation time since it was not affected by body metabolism. In 60 patients given duplicate tests within one hour, results showed greatest differences in patients with congestive heart failure. Differences were less in the group tested under basal conditions, indicating importance of this factor. Variations in technique, excitement, digestion, vitamin B_1 deficiency, and volume of circulating blood caused changes. Series of saccharin tests should be run to be conclusive.

ARCHIVES OF INTERNAL MEDICINE

Vol. 72, July 1943

* Pentosuria associated with diabetes mellitus. M. H. Edelman and M. Reiner.—p. 31.

* Association of cirrhosis, thrombopenia, and hemorrhagic tendency. C. G. Morlock and B. E. Hall.—p. 69.

Pentosuria. Essential pentosuria is a hereditary abnormality of metabolism in no way associated with diabetes mellitus. Small amounts of pentose are found in the urine, unaffected by alterations in the diet. Diagnosis of pentosuria depends upon presence of these symptoms: history of hereditary pentosuria, a normal dextrose tolerance curve, pentose in urine, and absence of usual diabetic symptoms. Joslin reports only 9 instances of pentosuria, and a high dextrose tolerance curve in only one. Failure to recognize pentosuria may result in treating the patient as a diabetic, with obvious harm.

Cirrhosis and Hemorrhagic Tendency. Factors other than the concentration of prothrombin may be of significance in the deviations from normal noted in coagulation mechanism in severe liver damage. It is not enough to administer vitamin K and assume patients are cured. A series of 80 cirrhosis patients was reviewed and thrombopenia found in 17.5%. The diminution of blood platelets in severe hepatic disease increases the hazard of bleeding, for which no explanation is offered.

BULLETIN OF THE JOHNS HOPKINS HOSPITAL

Vol. 73, July 1943

* Studies in the metabolism of the human placenta. I. Oxygen consumption in relation to aging. H. W. Wangard and L. M. Hellman.—p. 31.

Placenta Studies. The placenta is an organ having a limited life-span; effects on mother or child of its aging are not known. As pregnancy increases, oxygen consumption per unit weight decreases. Administration of analgesics and anesthetics during labor failed to influence use of oxygen. Oxygen consumption of the term placenta does not increase when glucose is added to the phosphate Ringer's solution, due perhaps to inability of villi at term to oxidize glucose.

HOSPITALS

Vol. 17, May 1943

* Hospital personnel in the war situation. M. E. Switzer.—p. 13.

* Food allowances for hospitals.—p. 46.

Refresher course for hospital dietitians.—p. 61.

Personnel standards in wartime. Editorial.—p. 70.

Vol. 17, June 1943

Hospitals and the food rationing program. A. M. Palmer.—p. 33.

Hospital Personnel in the War Situation. Hospitals now have to compete with industry in wages and hours. Though hospitals are considered essential institutions, an essential job must require 6 months or more of training and the occupation itself must be necessary to the functioning of the activity concerned. The U. S. Employment Service will give hospitals priority over less essential activities in referring workers. Many handicapped, older, younger and part-time workers must be used. Working conditions must be improved to try to effect voluntary labor stabilization.

Food Allowances for Hospitals. It is declared that the existing hospital food allowances are comparatively low and have not been based upon the needs of sick people. In spite of definite commitments by WFA, violations have resulted.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 122, August 7, 1943

* Synthesis of biotin. Current comment.—p. 1018.

* Domestic carbon monoxide poisoning. Current comment.—p. 1018.

* Stability of vitamins. Current comment.—p. 1018.

* Soya in sausages. Foreign letters.—p 1027.

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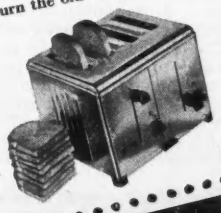

Want to get the most out of meat? Dress up your leftovers? Add tempting variety to your war-restricted menus? It's easy and simple—just make Toastmaster Toast part of every recipe and you'll add taste and eye-appeal and satisfying goodness to every dish you serve. Smart dietitians know that Toastmaster Toast costs hardly anything. And customers recognize the same crisp, golden "melt-in-your-mouth" goodness that they get at home. If you're lucky enough to have a Toastmaster Toaster, use it often. And if you don't have one, buy a War Bond and mark it "For a Toastmaster Toaster, after the War!"

HERE'S AN IDEA! Serve 2 slices of hot meat loaf on Toastmaster Toast. Top with a vegetable white sauce made with bacon drippings, diced carrots, onion, green pepper and peas. Add Toastmaster Toast points on each side, garnish with tomato wedge—and you have a delicious low-cost dish! For other suggestions send for our FREE RECIPE BOOK.

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THE NATIONAL HABIT WHEREVER FOLKS EAT!

Vol. 122, August 21, 1943

* Adjuvant alkali therapy in prevention of renal complications from sulfadiazine. D. R. Gilligan, S. Garb, C. Wheeler and N. Plummer.—p. 1160.
* The production of diabetes mellitus in rabbits with alloxan. C. Cabell and O. T. Bailey.—p. 1165.
* Xanthomatosis: A cause of coronary artery disease in young adults. H. Engelberg and B. A. Newman.—p. 1167.

Vol. 122, August 28, 1943

* Modified protamine zinc insulin: An improvement on standard protamine zinc insulin. C. M. MacBryde and H. K. Roberts.—p. 1225.
* Protamine zinc insulin modified for accelerated action. A. R. Colwell and J. L. Izzo.—p. 1231.
* Metabolic studies in patients with cancer of the gastrointestinal tract: Pancreatic insufficiency in a patient treated surgically for carcinoma of the ampulla of Vater. P. E. Rekers, G. T. Pack and C. P. Rhoads.—p. 1243.
* Insect vectors of poliomyelitis. Editorial.—p. 1250.
* Hypotryptophanic sterility. Current comment.—p. 1253.

Synthetic Biotin. Biotin, a factor in the B complex, involved in animal metabolism and also capable of exerting a noticeable biologic effect, under appropriate test conditions and in a dilution of one to 400 billion, is one of the most active substances known. A comparison of the physical and chemical properties of the synthetic product with those of naturally occurring material revealed no difference between the two substances. The physiologic response of biotin-deficient animals to the synthetic product was the same as to the naturally occurring biotin. The way has thus been cleared for the production of amounts of biotin which will greatly facilitate the carrying out of experiments designed to increase our knowledge of this member of the vitamin B complex.

Carbon Monoxide Poisoning. Special attention was given to the effects of carbon monoxide on health under domestic conditions such as a cook working in a small, badly-ventilated kitchen with a defective gas-stove. The results of such conditions are impairment of general health, nervousness, ill temper, and other general symptoms varying in intensity, depending on the quantity of monoxide in the blood, the activity and previous condition of the patient and other factors. It is to be noted that milder forms of monoxide poisoning do not present any distinctive clinical picture, the manifestations being essentially subjective. In suspected cases the definitive diagnosis will require proper chemical examinations of the blood of the patient as well as of the air he has been breathing.

Stability of Vitamins. Present government regulations make it illegal to add vitamins to alcoholic beverages. Nevertheless, the fact that many of the diseases associated with chronic alcoholism are due primarily to deficiencies in the vitamin intake of the excessive drinker makes information on the stability of vitamins in whisky of more than academic interest. A standard brand of 86.8-proof whisky was fortified with riboflavin, thiamin and nicotinic acid and part of the whisky exposed to daylight in clear bottles and part in amber bottles. A control portion was stored in the dark. The result of the assays showed that riboflavin is unstable in whisky, since a reduction of 50% of the amount added occurred in both paper-wrapped and amber bottles at the end of the 2-month period. At the end of 6 months assays indicated that loss of thiamin or nicotinic acid had not occurred and that these members of the vitamin B complex appear to be stable in whisky. Even if it should become legal to add vitamins to alcoholic beverages, physiologic considerations would incline to make such formulas undesirable.

Soya in Sausage. The war shortage of certain foods, particularly meat, has led to various alternatives. The latest innovation in food is the use of the soybean as an ingredient in sausage. In future sausage will be composed of 37.5% meat, 7.5% soya and 55% flour and water. The Ministry of Food states that it is impossible to make more meat available for sausages, but as the protein value of soya is about thrice that of meat, the protein content of sausages will be equal to what it was before the war.

Alkali Therapy. It is concluded that renal damage and urinary tract obstruction consequent to precipitation of sulfadiazine and acetylsulfadiazine are preventable and that adjuvant alkali therapy sufficient to maintain the urine neutral or slightly alkaline should be prescribed whenever sulfadiazine is administered.

Diabetes. Alloxan when given intravenously to rabbits produces necrosis of the islets of Langerhans. Brief hypoglycemia, if counteracted by repeated injections of dextrose, is followed by the development of symptoms seen in human diabetes, namely, hyperglycemia, glycosuria, polydipsia, polyuria, acetonuria, and lipemia.

Xanthomatosis. In 6 cases of xanthomatosis with coronary artery disease in young adults, three characteristic features were observed: skin xanthomatosis, coronary insufficiency and hypercholesteremia. A strong familial tendency is present and the disease often appears early in life. Therapy consists of a diet low in animal cholesterol and other measures usually prescribed for patients with coronary artery disease. The familial occurrence affords an opportunity for the prophylactic institution of a low-cholesterol diet in other members of the family as yet unaffected.

Protamine Zinc Insulin. A modified protamine zinc insulin having 75% slow or precipitated insulin effect to 25% rapid or soluble insulin effect can be substituted with advantage for the forms of insulin now employed in maintenance therapy of diabetes. Since the effects of this insulin are more closely adjusted to the requirements of most patients with diabetes, better control is possible with it than with standard protamine zinc insulin. A single injection daily should permit good regulation in the great majority of cases. The use of multiple forms of insulin should be discouraged. Good therapy of diabetes requires simplicity. Two forms of insulin should be sufficient: a modified protamine zinc and regular for crystalline insulin, for use in diabetic emergencies and whenever supplementary insulin is required.

Insulin Mixtures. Protamine zinc insulin as now prepared possesses inherent faults of timing, owing to slow or uncertain release of insulin from its injection depots. These are seen in diabetic practice as tendencies to glycosuria following meals, to hypoglycemia during fasting, especially at night, and as unpredictable undulations in insulin intensity. The timing and intensity properties of the ideal insulin for routine daily use were analyzed. A modification containing about one-third of the protamine and zinc contained in commercial protamine zinc insulin fulfils requirements most satisfactorily. In most diabetic patients protamine zinc insulin so modified releases insulin from morning depots at a rate which causes moderate increases in intensity when needed during hours of feeding. It also allows decreases when desirable during the hours of sleeping.

Pancreatic Insufficiency. A patient who had had the duodenum and the head of the pancreas resected and the pancreatic ducts ligated presented the clinical picture of pancreatic insufficiency. The administration of large quantities of pancreatic enzymes was followed by conspicuous clinical benefit and by a significant decrease in the amounts of fat and nitrogen excreted in the feces. An increase in the protein content of the diet resulted in increased absorption of fat. An increase of the fat content of the diet resulted in an increase of fat absorbed but no lessening of fat lost.

Poliomyelitis. Poliomyelitis virus was isolated from 8 of 15 samples of fieldflies collected during 1941 outbreaks of the disease. Other positive results were obtained from fly samples collected near a potential (though not proved) source of virus in the form of "exposed" human feces of recent origin. Whether or not the virus can multiply on or within the contaminated flies has not yet been determined.

Hypotryptophanic Sterility. Failure of farm animals to reproduce when placed on low-protein diets is of major economic interest. Study of the physiology of this nutritional sterility was facilitated when it was found that female rats placed on a low-protein diet also would not reproduce. It would seem that tryptophane is an essential dietary factor for normal gestation in rats and that the available reserves of this amino acid in maternal tissues is depleted within 10 days on a tryptophane-deficient diet. Whether or not reproductive failure of domestic animals on low-protein diet is due solely to tryptophane deficiency, however, has not yet been determined.

JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 149, July 1943

* Chemical and biological stability of crystalline vitamins D_2 and D_3 and their derivatives. W. Huber and O. W. Barlow.—p. 125.
* Liver glycogen and lipids in fasted and glucose-fed rats. C. R. Treadwell, H. C. Tidwell and B. G. Grafa, Jr.—p. 209.
* Production of thiamine deficiency disease by the feeding of pyridine analogue of thiamine. D. W. Woolley and A. G. C. White.—p. 285.
* The effect of simultaneous mineral and choline deficiencies on liver fat. P. Handler.—p. 291.

Stability of Vitamins D_2 and D_3. The usually accepted antirachitic value of 40,000 U. S. P. units per mg. for calciferol or crystalline vitamin D_2 and crystalline vitamin D_3 is 10 to 15% low.

Glycogen and Lipids in Liver. In unfasted male and female rats receiving a high-fat, low-protein diet, low also in lipotropic factors, the livers contained significantly greater amounts of glycogen and lipids than the livers of those on a high-fat, high-protein diet. The level of liver glycogen was independent of the amount of fat in the liver. Animals having fatty livers exhibited an increased rate of glycogenolysis during fasting and decreased glycogenesis following a standard dose of glucose. There was no change in total lipids of the liver during a 36-hour fast.

Disease From Pyrithiamin. Feeding of pyrithiamin, the pyridine analogue of thiamin, to mice caused characteristic symptoms of thiamin deficiency. The disease was prevented or cured by sufficient amounts of thiamin.

Red Label and Blue Label KARO are Interchangeable in Milk Modification

Both in chemical composition and in caloric value these two types of KARO are practically identical. There is only a difference in flavor.

Either is equally effective in milk modification. Your patients may safely use either type, if the other is temporarily unavailable at their grocers'.

How much KARO for Infant Formulas?

The amount of KARO prescribed is 6 to 8% of the total quantity of milk used in the formula—one ounce of KARO in the newborn's formula is gradually increased to two ounces at six months.

CORN PRODUCTS REFINING CO.
17 Battery Place • New York, N. Y.

When APPETITE APPEAL is the problem MALTEX has the answer

A cereal may contain all of the desirable Food Constituents in adequate amounts and proper proportions—but in the final analysis Appetite Appeal is the deciding factor as far as consumption is concerned.

Maltex is a hot, brown WHEAT Cereal that most children and adults enjoy immensely. It is rich with flavor—is an excellent source of food energy—and contains Vitamin B_1 naturally—*not added.*

MALTEX Cereal

Let Us Send You This DAILY DIET RECORD

Enables students to plan a week of well-balanced meals or keep a record of meals actually eaten. Widely used by Dietitians and Home Economics teachers. Colorful sheet shows the "Basic Seven" food items recommended by the National Wartime Nutrition Program for Daily Consumption. Order one for each pupil. (Offer limited to schools North of Washington, D. C. and East of Chicago.)

HOME ECONOMICS DEPT.
Maltex Company
Burlington, Vt.

Liver Fat in Dietary Deficiencies. Young male rats fed a low-protein, high-fat diet deficient in choline and minerals grew slowly for 2 weeks and at the end of this time their livers were moderately fatty. In the following 2 weeks the animals declined in weight and the liver fat content returned toward normal. These effects were not due merely to the level of food consumption, since choline-deficient animals given adequate amounts of mineral salts but whose food consumption was restricted to that of mineral-deficient animals continued to grow slowly and developed markedly fatty livers in the same period.

JOURNAL OF NUTRITION

Vol. 26, July 10, 1943

* The role of dietary protein in hemoglobin formation. A. U. Orten and J. M. Orten.—p. 21.
* The effect of concentration on the absorption of vitamin A. A. G. Reifman, L. T. Hallman and H. J. Deuel, Jr.—p. 33.
Biotin content of meat and meat products. B. S. Schweigert, E. Nielsen, J. M. McIntire and C. A. Elvehjem.—p. 65.
The retention of vitamins in meats during storage, curing and cooking. B. S. Schweigert, J. M. McIntire and C. A Elvehjem.—p. 73.

Protein and Hemoglobin Formation. A low-protein (lactalbumin) diet, adequate in other known respects, produces a mild chronic anemia in rats. This anemia is prevented or cured by adequate protein intake with no alteration in calories, minerals or vitamins. Increase of calories or iron has no consistent beneficial effect on hemoglobin formation in low-protein animals. Apparently an adequate intake of dietary protein is essential for normal hemoglobin formation in the rat.

Concentration and Vitamin A Absorption. The rate of absorption of vitamin A in rats was found to be proportional to the concentration of administered material. There was no relationship between rate of absorption of neutral fat and vitamin A. Vitamin A was not destroyed by intestinal bacteria over a 3-hour period.

JOURNAL OF PEDIATRICS

Vol. 23, July 1943

* Basal metabolism in rheumatic children. E. E Brown and V. P. Wasson.—p. 19.
* Hematologic and radiologic study of infants receiving massive doses of vitamin D in rickets prophylaxis. A. C. Rambar, M. Hardy and W. I. Fishbein.—p. 31.
* Significance of plasma ascorbic acid levels in Nebraska children. J. L. Gedgoud V. M. Wilder and J. A. Henske.—p. 39.
* Infantile scurvy. D. Blitz.—p. 87.

Basal Metabolism in Rheumatic Children. The basal metabolic rate in many rheumatic children is below normal. The decreasing metabolism noted from January through June may be due to the toxic effect produced on the thyroid gland during and immediately following the season of greatest rheumatic activity.

Vitamin D in Rickets Prophylaxis. A single massive oral dose of electrically activated vaporized ergosterol, containing 600,000 U. S. P. units vitamin D, was effective in preventing rickets in a group of infants studied during the fall and winter months. Repeated smaller doses of 100,000 U. S. P. units of the same antirachitic agent given monthly during this period were also effective in preventing rickets. No toxic clinical or laboratory findings were reported.

Plasma Ascorbic Acid Levels. Studies on Nebraska children of the lowest income group on daily intake of 60 to 80 mg. ascorbic acid, established 0.7 mg. % as a satisfactory plasma ascorbic acid level with 0.4 to 0.69 mg. considered "borderline." In 12 children with infections, acute and chronic, from 100 to 150 mg. daily was adequate to raise the plasma level to 0.7 mg. % or more in 11, over periods of from 3 to 21 days.

Infantile Scurvy. A case report is presented with classical symptoms and typical roentgenograms of acute infantile scurvy. A follow-up roentgenogram 4½ years after clinical cure is presented with characteristic findings.

PUBLIC HEALTH REPORTS

Vol. 58, July 16, 1943

* Community services *vs.* lost man-hours. P. V. McNutt.—p. 1082.

Community Services *vs.* Lost Man-Hours. Nutrition is of the utmost importance in keeping the worker on his job and maintaining his efficiency. The nutrition problem as it concerns the war worker is more a question of distribution than supply. Restaurants are overcrowded and unsatisfactory.

SCIENCE

Vol. 98, July 30, 1943

* Riboflavin-vitamin B_2 in soil. C. C. Carpenter.—p. 109.

Riboflavin in Soil. Studies indicate that certain vitamins, particularly riboflavin, are present in the soil and that some plants take up vitamins from this source as they absorb essential mineral elements. If this is so, the presence or absence of vitamins in soil becomes a vital factor in crop production and soils management.

Sweet Potatoes

Instead of being armchair military strategists, we can help in the war effort by being lunchchair strategists and change our food buying and eating habits as food supplies change on the home front.

It will be good strategy this fall and winter to buy, eat, and store sweet potatoes, as there will be a plentiful supply throughout the country. If these are used frequently in cafeteria and home menus, and are stored for future use wherever there is available a basement or other cool storage place, it will help to prevent waste of our country's sweet potato supply. (Only cured sweet potatoes are suitable for long storage, however.)

The production of sweet potatoes is estimated at over 81 million bushels, an increase of 15 million bushels above last year's production. The local market news offices will provide information on supplies and prices.

Sweet potatoes are an especially good source of vitamin A, which is frequently lacking in the war worker's diet. An average-sized sweet potato should provide nearly all the vitamin A needs for the day. Sweet potatoes are not only a good source of vitamins A and C, but they also provide energy, and are a good source of iron and vitamin B_1.

Cafeterias and restaurants, boarding houses, and homes can provide variety and food values on their menus this fall and winter by using sweet potatoes. The Nutrition in Industry Division of the Food Distribution Administration has prepared a number of menu suggestions and recipes for the use of sweet potatoes in war workers' meals. Several of these menus and recipes, samples of which follow, make use of pork, which is now more plentiful than beef. Pork is one of the richest sources of vitamin B_1 in the diet, and is especially popular when combined with sweet potatoes. [Sweet potatoes are also a desirable accompaniment to other meats, notably chicken, sausage, and lamb. Ed.]

Scalloped Sweet Potatoes and Apples

(100 6-oz. portions)

Tart apples, cored and peeled	16 lb.
Sweet potatoes, cooked and peeled	16 lb.
Light brown sugar	5 lb.
Fat	1 lb.
Water	1½ qt.
Salt	1 oz.

1. Peel and core the apples; cut in thin slices.
2. Peel and slice the cooked sweet potatoes.
3. Make a syrup of the sugar, fat, water, and salt.
4. Put alternate layers of the sliced apples and sweet potatoes into oiled baking pans and pour the syrup over them.
5. Bake in a moderate oven for about 1½ hours or until the apples are tender.

Menus Using Sweet Potatoes

I.
Shoulder roast of pork
Baked sweet potatoes
Green beans
Raw carrot strips
Enriched rolls and butter
Baked lemon pudding
Coffee, tea, or milk

II.
Baked ham
Glazed sweet potatoes
Cabbage and green pepper salad
Cornbread and butter
Peach shortcake
Coffee, tea, or milk

III.
Sausage cakes
Scalloped sweet potatoes and apples
Sliced tomato and lettuce salad
Whole wheat bread and butter
Orange custard—ginger cookies
Coffee, tea, or milk

IV.
Braised chicken
Baked sweet potatoes
Buttered green peas
Green vegetable salad
Enriched rolls and butter
Cherry pie
Coffee, tea, or milk

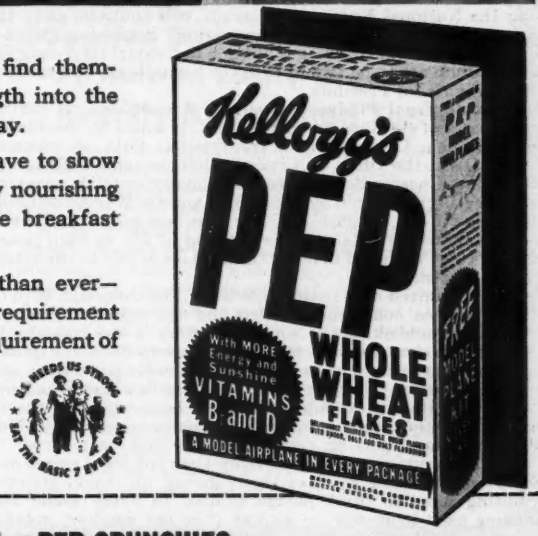
In war time when food is as important as ammunition, one product may be scarce at one time and plentiful at another. It is good strategy to know what to eat in place of a food that is scarce, and to be ready to make full use of those that are plentiful. —*Industrial Nutrition Service, WFA, September 1943.*

HELP FOR POST-WAR GENERATIONS

THROUGHOUT the whole profession, dietitians find themselves absorbed in the task of building strength into the people of tomorrow—through proper nutrition today.

In spite of shortages and rationing, dietitians have to show the public how to obtain well-balanced, thoroughly nourishing meals. A big help in this is the always available breakfast cereal, KELLOGG'S PEP.

The *new* PEP—more appetizing and delicious than ever—contains per one-ounce serving the minimum daily requirement of vitamin D (400 U.S.P. units) and ¼ the daily requirement of vitamin B_1—½ for children up to 5 (84 U.S.P. units). Yes, the new PEP gives a person an excellent start towards the day's nutrition requirements!



Try this recipe for tempting PEP CRUNCHIES

Ingredients	*4 Dozen (1 lb. 10 oz. mix)*
Shortening	⅔ cup (4⅓ oz.)
Brown Sugar	¾ cup (4½ oz.)
Eggs	2 (3½ oz.)
Almond Extract	½ teaspoon
Vanilla Extract	½ teaspoon
Flour	1½ cups (6 oz.)
Baking Powder	2 teaspoons (¼ oz.)
Salt	½ teaspoon
Chopped Nut Meats	1 cup (4 oz.)
Kellogg's Pep	3 cups (4 oz.)

One Cookie: 1¾ inches diameter

1. Blend shortening and sugar together. Add eggs and flavoring; beat well.
2. Sift flour, baking powder and salt together. Add to first mixture with nut meats and Pep; mix well.
3. Drop by teaspoonfuls onto greased baking sheet; flatten with fork. Bake in moderately hot oven (400° F.) about 10 minutes.

News Notes

Report of Nominating Committee, House of Delegates, American Dietetic Association. Helen Baughman, chairman, Phyllis K. Sprague, and Mrs. Lola T. Dudgeon, members of the Committee, present the following slate: Chairman of the House, Dr. Lillian B. Storms, Michigan, and Maxine Turner, Oklahoma; Nominating Committee (three to be elected), Marion D. Floyd, Massachusetts, Fern W. Gleiser, Iowa, Elizabeth W. Hayward, California, Kathryn Heitshu, Virginia, and Lucille B. Rice, Alabama.

"Food Fights for Freedom" Campaign. Detailed plans for a concerted effort to bring to the nation an awareness of food as a vital weapon of war were presented to leaders of food and allied industries at a meeting in Chicago August 24, sponsored by WFA, OPA, OWI, and the War Advertising Council. A similar meeting in New York August 26 was followed by a series of meetings in 26 other leading cities. Labeled "Food Fights for Freedom," the program called for mobilization of the production and distribution branches of the food field in a drive that was launched immediately. It will achieve a peak in November, which will be proclaimed "Food Fights for Freedom" month, and continue thereafter. The campaign is a broad educational effort, designed to make more effective such essential wartime programs as nutrition, conservation, Victory Gardens, rationing, and farm production goals.

The four major objectives are: (1) To increase food production on farms, in orchards, on ranches, in Victory Gardens. (2) To increase food conservation. (3) To increase food sharing. (4) To play square with food—to kill black markets, discourage hoarding, observe ration regulations, comply with ceiling prices. Promotional material for the campaign is designed to inform the public, first, about wartime food facts and second, about means of cooperating actively in making the best possible use of food. An official campaign symbol was adopted; other materials include a food allocation chart, showing the proportions of available food supplies going to the armed forces, Allies, outlying territories and the civilian population; local and network radio program tie-ins; store posters and displays; outdoor posters; a kitchen pin-up chart with a score card for measuring cooperation with the campaign's objectives.

According to the plan set forth in a brochure on the informational phases of the program, the individual food programs, including the National Nutrition Program, will continue as in the past, but with this major implementation: Beginning October 1943, wherever feasible, messages on each individual food program in each medium are to be tied in with the basic theme and emblem of "Food Fights for Freedom."

OPA Home Front Pledge Campaign. A campaign to control rising prices and stabilize the home front, planned by the Group Services Branch, Department of Information, OPA, in cooperation with OWI, the Office of Civilian Defense, and USDA, was announced by Chester Bowles, general manager of OPA, speaking before a meeting sponsored by WFA, OPA and the War Advertising Council, New York, August 26. The plan has been tried out in New Orleans, where it is said a reduction of 5% in food prices resulted. It is "designed to bring the need for action to the attention of all citizens."

Though organized on a nationwide basis, the campaign is to be carried on by local community leaders and will include the following activities: publishing the top legal prices in the community and seeing that these get into the hands of every citizen; explaining to every housewife how to use the community price lists, and how to report price violations to the price panels of her War Price and Rationing Board; explaining to every housewife the reasons for using her ration stamps properly and persuading her to abide by the regulations; getting every housewife and wage earner to sign a pledge promising to pay no more than top legal prices and to accept no rationed goods without giving up ration stamps; distributing a home front pledge symbol to every home and persuading each housewife to display it in her window; holding meetings in local communities; developing and using adequate local publicity and advertising to support the campaign; developing an effective plan in each community for continuing the campaign. Suggestions for conducting these and other activities and descriptions of available promotion material are contained in a campaign outline prepared for Community Service Members of War Price and Rationing Boards by the Campaigns Division, Department of Information, OPA, Washington.

A sound-slide film on the campaign was to be made available in district OPA information offices by September 15. This is a series of still pictures synchronized to a recording, running about 30 minutes. Equipment needed is a sound-slide film projector and a screen or very light wall. The pictures include a woman in her kitchen just back from shopping for family groceries, a representation of the cost of the groceries today and the prewar cost, a shopping picture, the Home Front Pledge, scenes in war plants, on farms, in stores, and in homes to dramatize the need for price control; scenes to show what the women of the country can do to help maintain price control and how they can do it; scenes of black market operations showing how they affect the rationing program. The District OPA Information Offices will provide suggestions for borrowing or renting a projector.

National Food Situation. The July *Demand and Price Situation*, prepared by the Bureau of Agricultural Economics, USDA, stated that with per capita civilian supplies of most foods about as large as before the war, it is not a general food shortage but the high and still rising level of income and demand by domestic consumers which is largely responsible for rising food prices. As far as food is concerned, military and Lend-Lease requirements have not done much more than offset the effect of increased production. Military and Lend-Lease demand for farm products will continue to increase. The recent reduction in merchant shipping losses, along with the increased destruction of enemy submarines, is making possible a growing overseas movement of all kinds of goods, including agricultural products. A large portion of these products now being shipped to the Allies is coming from stock piles accumulated in anticipation of the improved shipping situation, but the replenishment of these stock piles may be expected to increase the demand for farm products.

The August report states that consumer income during the remainder of this year is expected to continue to increase, but at a slower rate than in the first half of 1943 or the second half of 1942. The rate of increase may not vary much from the average in the second quarter, which was just over 1% a month. Revised budget figures for the current fiscal year indicate that income of consumers after paying taxes will be about 8 billion dollars larger than in the last fiscal year, widening by about one-fourth the already wide gap between disposable income and civilian supplies of goods and services. For about 3 years the index or wholesale prices of all commodities has been rising, almost without interruption. From May to July declining prices for farm and food commodities lowered the over-all index one point. From mid-June to mid-July, the Bureau of Labor Statistics index of the urban cost of living dropped a full point—from 124.8 to 123.8 (1935–39 representing 100). Lower prices for meats and fresh vegetables brought a 2% decline in food prices, more than offsetting an increase in clothing prices amounting to .5%.

The July *Vegetable Situation* reports that although total supplies of potatoes this season are expected to be about 15 to 20% larger than last season, civilian supplies (because of increased non-civilian requirements) are expected to be only about 5% larger. Production of 83 million bushels of sweet potatoes is indicated for 1943—or 27% more than 1942, providing civilians 15 to 20% more than that consumed in 1942–43. Present prospects indicate that the supply of processed vegetables for civilians in 1943–44 will be considerably smaller than in 1942–43. Total planted acreage is about 1% larger than in 1942, but yields of most crops probably will be lower. The late onion crop is expected to total about 12 million 100-lb. bags, which is slightly above average, but demand is far above average. Nearly one-fourth of the crop will be required to meet direct war needs, and FDA has ordered control of shipments by growers so that these needs will be met.

WFA's *Cold Storage Report*, August 1, states that all items in cold storage with the exception of shell eggs showed substantial net increases during July, including frozen poultry, meats, and lard which normally decrease during July. Frozen fruit stocks and cheese holdings were below those of August 1, 1942, while eggs, frozen vegetables, and butter, were above those of a year earlier. Frozen and cured beef, pork, and lard stocks were heavier than both those of last year and the average.

According to a report on fluid milk prices in city markets, August 1943, the prevailing retail price of milk delivered at homes of consumers in 25 cities now averages 14.90 cents per quart, compared with 14.84 cents in July and 14.20 cents a year ago. Retail prices are higher than in any month since the early 1920's.

An FDA release states that with few exceptions the 1943 fig crop from the main producing counties of California will be used for food. Unless special authorization is given, manufacturers cannot use figs for other purposes.

Soya flour and grits are expected to appear on the market in quantity sometime in October, according to the Magazine Division of OWI. Recipes by the manufacturers and those prepared by BHNHE will be ready for distribution at the same time.

Nutrition Program Materials. Recent additions to the list of publications, New York State College of Agriculture at Cornell University, Ithaca, are the following War Emergency Bulletins, distributed free to residents of New York State: E. 496, Soybeans;

HYPOPROTEINEMIA

WHEN IT IS PRESENT OR WHEN IT IS THREATENED...

DIETENES
(PLAIN) *Accessory Feeding*

Supplies Biologically Superior Protein in Easily Digested, Readily Assimilated Form.

Deficiency states, whether present or threatened, offer problems in nutritional adequacy. Dietene's Accessory Feeding assures nutritional adequacy without burden to the gastrointestinal mechanism. In hypoproteinemia, especially, Dietene's Accessory Feeding affords a biologically superior protein in easily digested, readily assimilated form. It is also high in vitamins and minerals, thus providing essential nutriments in concentrated and palatable form. In conditions where the ingestion of normal food is restricted, Dietene's Accessory Feeding may be used to prevent dietary deficiencies. In deficiency states where only a food supplement, as such is indicated, Dietene's Accessory Feeding is ideal. Its low fiber content (.2%), its low fat content (.18%), its high protein content (32.5%) make this food supplement useful under many different pathological states. Dietene's Accessory Feeding is especially valuable where low bulk in the diet is indicated. It also greatly simplifies the problem of mixtures to be used in tube feedings.

SPECIAL DIETS AND LITERATURE ON REQUEST

THE DIETENE CO., Dept. DJ 103
Minneapolis 15, Minnesota, U.S.A.

Gentlemen: Please send, without cost or obligation, a regular one pound retail size package of Dietene's Accessory Feeding. *Check either or both*
Plain ..... ☐
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E. 500, Raising the Family Pork Supply; E. 501, Butchering the Family Pork Supply; E. 521, Wise Use and Care of an Electric Refrigerator; E. 523, Safe Use and Care of a Pressure Cooker; E. 585, Convenience in Canning and in Storing Canned Food; and E. 594, Varieties of Vegetables and Fruits for Freezing. Non-residents of the state may obtain the above at 5 cents each.

"Feed Your Body to Protect Your Health" is the title of a new leaflet prepared under the direction of Frances Stern, which supersedes the familiar yellow leaflet distributed for many years by the New England Dairy Council. It is understood that a commercial concern paid for the printing, but the copyright and distribution are controlled by the Frances Stern Food Clinic of the Boston Dispensary, 25 Bennet Street, Boston. The leaflet, which should be of material aid in teaching, lists suggested kinds and amounts (in common household measures) of food needed per day—milk, cheese, meat, eggs, butter, legumes, etc. etc.—and their nutritional value (in gm., mg., units, etc.). The functions of the various food constituents are graphically and forcefully illustrated and the stated daily requirements for each have been adapted from N.R.C. recommendations. On the reverse of the sheet, simple and complete directions are given on how to choose the foods that supply the substances (food constituents) that the body needs every day. Here, too, amounts are stated in common household measures, with suggestions as to methods of preparation. Foods are also grouped with regard to equivalent values to aid the calorie counter and the diabetic, among others, who seek a nutritionally "balanced" diet in terms of the essential food constituents.

The second in a series of pamphlets prepared and distributed by the Nutrition and Food Conservation Branch, FDA, is "Planning Meals for Industrial Workers." The workers' needs, and types of industrial food services are described, also how to plan meals to meet nutritional standards. Master menus are listed for various types of industrial service, including cafeteria menus, suggested lunch combinations for canteen service, box lunches, between-meal snacks, and comprehensive lists of main-course combinations, soups, sandwich fillings, and desserts. Copies of the pamphlet are available at regional offices of FDA (for addresses, *see* p. 542, this JOURNAL for July).

Though belatedly received, an excellent leaflet for general distribution on the canning of tomatoes, prepared by BHNHE, should be mentioned here; also an unusually excellent set of 20 charts on home canning which serves as a permanent "still demonstration" on the walls of schools and canning centers (price 50 cents on application to Superintendent of Documents, Government Printing Office, Washington). Step-by-step directions are clearly illustrated by photographs and some canning "don'ts" by cartoons. The three types of glass jars now procurable are also pictured and described. Copies of the leaflet "Canning Tomatoes" are available from Office of Information, USDA, Washington.

WFA's August *Nutrition News Letter* calls attention to the fact that the poster, in color, "Eat the Basic 7 Every Day," is now available. Distribution direct to post offices, banks, libraries, war plants, beauty parlors, housing projects, shipyards, retail stores, hotels, restaurants, drug stores, government agencies, etc. was made by the printer. Additional copies to fill the needs of local nutrition committees may be obtained from regional offices of FDA.

Posters on conservation entitled "Fight Food Waste in the Home," in black and red, 14¼ x 20 inches, prepared by BHNHE, are now ready and may be purchased from the Superintendent of Documents, Government Printing Office, Washington, at 25 cents per set of ten. Each of the ten posters treats one class of foods to be conserved in cooking or storing in the home. Another set of ten posters in the same size at the same price is available, entitled "Get the Good From Your Food," showing how to prepare fruit, vegetables, meats, fats, eggs, and poultry.

Other printed materials available from FDA regional offices to which the *News Letter* calls attention (all of which have been mentioned before in this JOURNAL) are: "Wartime Canning of Fruits, Vegetables," which supersedes, in part, USDA Farmers' Bulletin 1762 and includes a canning table, a discussion of equipment, and other points to be considered in canning at home or in a canning center; "Fats in Wartime Meals"; "Dried Beans and Peas in Wartime Meals"; "Green Vegetables in Wartime Meals"; "Root Vegetables in Wartime Meals."

Red Cross Dietitian's Aide Class Graduates. The New York *Herald Tribune* for August 11 reported that the Fifth Avenue Hospital was the first in New York City to graduate a class of dietitian's aides. Eight women completed the work there, and it is reported that 80 more are enrolled in various hospitals throughout the city. It is hoped that a total of 2000 will enroll before the end of the year. Mrs. Grace Keane, head dietitian of the hospital, is quoted as saying: "These women are wonderful. They are supposed to work only 4 hours a week and they're all volunteering to work 20 hours—or even more." Mr. William H. Miller, business manager of the Fifth Avenue Hospital, is reported to have said that they could use 175 aides. It is understood that courses have been instituted at the New York, Presbyterian and Mount Sinai Hospitals.

Postgraduate Assembly on Nutrition in Wartime. The Institute of Medicine of Chicago will hold an assembly, November 18–19, Palmer House, Chicago, devoted to phases of nutrition of particular interest to practicing physicians, dentists, nutritionists, and dietitians. The program will include 5 addresses, 6 panel discussions, a "Nutrition Information Please" program and the First William Hamlin Wilder Memorial Lecture, by Dr. Russell M. Wilder, chief, Civilian Food Requirements Branch, WFA. Among the subjects to be presented are: "The Impact of the War on the Diet of the City and Rural Dweller," Dr. Frank L. Gunderson, executive secretary, Food and Nutrition Board, National Research Council; "Some Pathologic Aspects of Undernutrition," Dr. Paul R. Cannon; "Present-Day Concepts of Nutrition Requirements," Dr. Lydia J. Roberts; "The Role of Carbohydrate in the Diet," Dr. Samuel Soskin; "Some Obstacles in the Path Toward an Optimum Diet," Dr. Anton J. Carlson; "Overweight and Underweight," Dr. Edward H. Rynearson. A complete program and registration blank can be secured upon application to the Institute of Medicine of Chicago, 86 East Randolph Street, Chicago.

Inter-American Cooperation in Health Work. In a report by Col. Albert R. Dreisbach, assistant director, Health and Sanitation Division, Office of the Coordinator of Inter-American Affairs, Washington, which deals largely with the public health aspects of work carried on as a result of agreements with 15 other American republics, mention is made of a food program, undertaken by the Institute of Inter-American Affairs in cooperation with the other republics. According to the report, "Food has been linked with health to make what is known as the Basic Economy Division of the Coordinator's Office. . . . Like the health and sanitation work, the food program promises to bring lasting benefits in the improvement of living standards in the Americas."

Changes in Rationing Regulations. OPA has announced that, in accordance with amendments to Ration Orders 5, 13, and 16, effective August 18, members of the food trades not eligible or required to maintain ration bank accounts are to be provided with a new type of red and blue food ration coupons. The new coupons will be used in the same way as stamps, certificates, and ration checks but will not require endorsement and will not expire. They will be issued in denominations of 1, 5, 20, 100, and 1000 points. Institutional users which served 3000 or more persons in December 1942, or in any month from March 1943 on, will continue to be eligible for ration banking, or to receive certificates even if they do not have bank accounts.

Food Advisers Appointed, New York City. As part of a plan to provide a nutrition program that fits the needs of the people the New York State Emergency Food Commission has appointed nutritionists for the boroughs of the Bronx, Brooklyn, Queens and Richmond for consultation on every phase of food preparation. Special emphasis will be placed on meat substitutes and demonstrations will be conducted showing the proper preparation of vegetables so that food values, color, and flavor are retained in cooking. When the soybean crop is harvested the various uses of this product will be presented. The newly appointed nutritionists now available for consultation include Barbara Van Heulen, Room 719, Brooklyn Trust Company Building, 25 Montague Street, Brooklyn; Mary Fitz Randolph, Room 317, 92–32 Union Hall Street, Jamaica; Genevieve A. Judy, Room 31, Corn Exchange Bank Building, 26 Bay Street, Staten Island; and Adeline Hoffman, (who is a member of the A.D.A.), Suite 320, 391 E. 149th Street, Bronx. Dean Sarah G. Blanding, College of Home Economics, Cornell University, heads the Human Nutrition Department of the Emergency Food Commission.

Nutrition Center Opened in New York. A food and nutrition center, to be the headquarters of the New York City Food and Nutrition Program, was opened July 28 at 45 Lafayette Street, Manhattan. The center is primarily an information bureau where persons may receive free nutrition advice and materials prepared by the participating agencies, keyed to the latest wartime market conditions. Dr. Ernest L. Stebbins, city health commissioner, presided at the opening and speakers included Mayor Fiorello H. LaGuardia and Dr. Grace MacLeod, professor of nutrition, Teachers College, Columbia University.

Civil Service Positions Open to Dietitians, Los Angeles County. Permanent civil service positions paying $159 to $187.80 per month are now available, according to an announcement received from Mr. George C. Brown, chief of the Examination Division. Persons 21 to 55 years of age who have graduated from an accredited college with a major in home economics, dietetics, or foods and nutrition and who have also completed an approved hospital, administrative or clinical course in dietetics are wanted for these positions. One year's "technical dietetics experience" in a hospital or clinic may be substituted for the graduate course in dietetics. Full information regarding these positions may be

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Special arrangements will be made by the hotel to accommodate three or more in large rooms.

Fritz Kreisler will give a concert in Pittsburgh, Friday evening, October 22. Any members interested in attending should write Miss Jennie M. Barton, Presbyterian Hospital, Pittsburgh, Pennsylvania.

For program see September issue, page 672.

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☐ I enclose 65¢ for Foley Food Mill, postpaid.
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obtained from the office of the commission, 102 Hall of Records, Los Angeles 12, or by telephoning Mutual 9211, Los Angeles.

Applications for the post of administrative dietitian which were to be filed on or before September 16, 1943, were also sought by the Los Angeles County Civil Service Commission. This position, at Olive View Sanatorium, would include full charge of the kitchens and responsibility for the preparation and serving of all foods. Applications were restricted to college graduates with a major in home economics, dietetics, or foods and nutrition, who had also had 3 years' experience as a dietitian in a hospital or other institution, including supervision of personnel for one or more years.

National Restaurant Association Wartime Food Conference. Subjects to be covered at this meeting, Cleveland, October 19–21, include: "Mass Feeding of Civilians—An Essential Wartime Responsibility"; "What Foods Are Needed for Victory"; "Food Conservation and Nutrition"; "How to Solve Employment Problems"; and "What Will Tomorrow Bring—in Public Relations, Postwar Problems, and Behind the Scenes in Washington." The National Restaurant Association *News Letter*, August 25, states that Tuesday, October 19, will be designated as "Manpower Day," when topics such as sources of labor, training employees, and keeping and paying employees will be discussed. October 20 will be "Food Day," when menu planning under point rationing, "pointless" dishes, and food demonstrations will be part of the program. Other subjects will be available foods both now and in the future and news from behind the scenes in Washington.

The same issue of the *News Letter* also reports that a Food Service Program for the coordination of all food service activities within the Army Service Forces became effective July 31. According to this account, "Commanding generals of service commands will establish at their respective headquarters a Director of Food Service, who, under the command of the commanding general of the service command, will be responsible for: the supervision and inspection of messes, bakers and cooks schools, and bakeries; the preparation and serving of proper menus; and the enforcement of all published regulations or instructions pertaining to the distribution, preparation, consumption, and conservation of food." R. D. Clark, past president of the National Restaurant Association, is chief consultant of the Food Service Section.

Training Food Supervisors in Hotels. Manager J. C. Meacham of Hotel Statler, St. Louis, recently presented Marjorie Brown, food supervisor, with a certificate testifying to the fact that she had satisfactorily completed the Food Supervisor's Training Course of Hotels Statler Company, Inc., according to the *Hotel Monthly* for August.

Applicants for this course must hold a B.S. degree in home economics, it is said, from a recognized school. The one-year training period consists almost entirely of practical working experience in each of the following departments—pantry, vegetable kitchen, pastry shop, and guests' and employees' cafeterias, covering all stations and shifts as assigned by the food supervisor and cafeteria managers. Trainees also receive practical training in ordering, menu planning, cost accounting, food control, and planning working schedules.

Rabbits, Muskrats, Whale, Shark, Mussels, and Squid as Food. In an article entitled "From Unfamiliar Sources," Jane Holt, in the New York *Times*, August 29, discusses the raising, cooking and serving of these foods. The Fish and Wildlife Service (Chicago Branch) of the U. S. Department of the Interior, it is stated, is encouraging home production of rabbits and offers free of charge leaflet No. 218, entitled "Domestic Rabbits in the Food for Freedom Program," which gives complete instructions for building hutches and selecting breeding stocks. Rabbits are now being raised by the millions in every state from California to Maine, say Service officials, who estimate that in 1942 more than 6,500,000 lb. rabbit meat was consumed in Los Angeles alone.

Similar in flavor to wild duck, muskrat meat is fine-textured, tender, and dark red in color, according to Miss Holt. Before being cooked it should be soaked overnight in cold, salted water or weak vinegar to reduce its gaminess. Young animals may then be broiled or fried; older muskrats, like older rabbits, require long cooking and so are suitable for stews and casserole dishes. Further information on preparing them for the table is contained in Wildlife Leaflet No. 229, "Recipes for Cooking Muskrat Meat," which also may be obtained free of charge from the Service. "Should you decide to trap your own muskrats, you are cautioned not to set out until November. During the summer the animal is unpalatable, being permeated with a musky odor."

Whale meat is recommended as a substitute for beef. "Dark red in color and free of any fishy flavor—after all, a whale is a mammal—this meat has rarely appeared on the American dinner table since World War I." Tons of whale steak arrived in San Francisco in June and several vessels of the Southern California sardine fleet have been converted into whalers. New York expects shipment soon, according to one wholesaler who has plans for distributing about 1,000,000 lb. throughout the city. Steak of the soupfin shark, a product of California waters, has been utilized in the Pacific Coast area since last winter, and a recent report indicates that Atlantic shark fillets are finding favor in Washington and cities in the South. Mussels and squid, esteemed by Europeans and used by Italian, French and Spanish sections of our cities, are worth investigation, states Miss Holt. Mussels, first cousins to clams and oysters, are prepared for the table in the same manner as these foods. Adaptable to various cooking methods, squid offers extremely palatable white meat that is not unlike crab.

For those interested in growing, cooking and serving rabbits in quantity, the *Hotel Monthly*, August, contains many suggestions and recipes. In regard to tularemia, USDA is quoted as saying, "Domestic rabbits are known to be susceptible to tularemia under laboratory conditions, but no case of the disease has been recognized in commercial rabbitries. There is no danger of contracting tularemia from eating rabbit meat, if it is thoroughly cooked, even though the animal may have been infected." The article suggests that it would be well to acquire the habit of preceding the word "rabbit" by the word "domestic" to avoid any chance of confusion or misunderstanding, since it is generally conceded that domestic animals raised in confinement under intensive commercial production conditions are immune to the disease as ordinarily transmitted.

Facts About Eggs and Poultry Meats. Prepared by Kathryn B. Niles, home economist, the following information concerning eggs, chickens and turkeys is presented by the Poultry and Egg National Board, Chicago: The reported production of eggs for the first half of 1943 is the largest on record for any similar period, 14% above 1942 or 44% above the 10-year average. The reported laying chickens on farms during June 1943 totaled 355,197,000 or 14% over 1942 and 33% over the 10-year average. The goal of 560,000,000 lb. turkey meat will be exceeded as the season advances. The industry is cooperating with the Army to ensure every military man Thanksgiving turkey and necessary supplies were being processed early in the season in time to start their journey toward the supply lines of the fighting forces. For the benefit of the amateur poultry raiser, a folder describing the proper methods for killing and dressing chicken may be obtained upon application to the Board at 308 W. Washington Street, Chicago. Recipes are also available.

Navy Cook Book. The National Restaurant Association *News Letter* for August 6 quotes in part a letter from the Secretary of the Navy to the chairman of the National Restaurant Association War Committee in which the completion of this book is announced. Secretary Knox is reported as having said, "It is my understanding that this excellent manual was prepared by a sub-committee of the National Restaurant Association War Committee." The chairman of the sub-committee was Dr. Mary de Garmo Bryan, Teachers College, Columbia University.

Nutrition Studies During Pregnancy. Mrs. Bertha S. Burke, associate in nutrition, School of Public Health, Harvard University, is the senior author of a paper on this subject in the *American Journal of Obstetrics and Gynecology*, July 1943. The article is divided into three parts, namely: Problems, Methods of Study and Group Studied; Relation of Prenatal Nutrition to Condition of Infant at Birth and During First Two Weeks of Life; and Relation of Prenatal Nutrition to Pregnancy, Labor, Delivery and the Postpartum Period. It is understood that reprints are available on application to the Department of Child Hygiene, Harvard School of Public Health, 55 Shattuck Street, Boston.

Correction, Current Literature Section. Under the heading "Health of the U.S. Army," on page 652 of the September JOURNAL, owing to a transposition of numerals it was stated that an expert on nutrition was placed on the staff of the Surgeon General in 1904. The year of course, should have appeared as 1940.

Miriam Williams Author of Recent Book. *Home Canning Made Easy*, a new book published by the Macmillan Company, was written by Miss Williams, member of the Philadelphia Dietetic Association. As foods editor of the *Farm Journal and Farmer's Wife* Miss Williams has traveled over much of the country and talked with women about their canning problems. She was formerly extension nutritionist in Colorado. Her book is dedicated to "My 4-H Club, college and extension teachers who taught me the way things *should* be done and to my farm women who always manage to figure out a way things *can* be done." There are 20 pages of how-to-do-it drawings, explaining each step of the four major methods of canning, and demonstrating methods of brining, pickling, and drying. Included are a number of excellent recipes, some hints on nutrition, a "Victory Food Budget," the "Basic 7 Nutrition Chart," and a table on how to get the most in food value from fruits and vegetables.

Madison (Wisconsin) Dietetic Association. The following officers have been elected for 1943–44: president, Lucille Billington, State Department of Public Health; vice president, Ruth Dickie, head dietitian, Wisconsin General Hospital; and secretary-treasurer, Agnes Schoenfeld, University Dormitories.

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a greater concentration ... reverse was not always true.

"12. Enrichment of white bread with thiamine, nicotinic acid and iron (and also with riboflavin) is not the equivalent of enrichment with non-fat milk solids. Non-fat milk solids definitely improves the nutritive value both of enriched white bread and of whole wheat bread."

● This and eleven other significant conclusions by well known nutrition investigators are based upon *controlled feeding tests* designed to assess the value of defatted milk solids as a white bread ingredient compared with the enriching nutrients of the official program and with those portions of the wheat kernel discarded in the milling of white flour—also to determine to what extent, if any, enriched bread and whole wheat bread are improved nutritionally by the inclusion of non-fat milk solids.

"The enrichment of flour and bread with thiamine, iron and nicotinic acid according to the prevailing practice is undoubtedly a wise procedure that may be expected to improve the nutritional status of a considerable, though quite unknown, proportion of the population. It would be regrettable, however, if this latest program for the nutritive betterment of bread should supercede the much older program of the inclusion of non-fat milk solids in bread, or should be considered the equivalent of such inclusion."*

Problems of supply and wartime demands add to the complications of restricting Orders but the fact is now established that milk *belongs* in bread. Six per cent or more is recommended for proper nutritional levels.

*Jl of Nutrition, Vol. 25, pp585-603. (June 1943)

AMERICAN DRY MILK INSTITUTE, Inc., 221 N. La Salle St., Chicago

Dietitians in Milwaukee will institute a Red Cross Dietitian's Aide course this fall. Nell Clausen and Mrs. Breta Griem are co-chairmen of the group making the necessary plans. Although more than 100 Red Cross nutrition courses have been given in Milwaukee, because of the number of requests many more will be given throughout the city and suburbs in the near future.

Miss Clausen and Mrs. Magna Schley, dietitians at Milwaukee Children's Hospital, entertained members of the Milwaukee Dietetic Association at a picnic honoring the student dietitians of the Milwaukee County Institutions.

Annette Snapper, associate member of the Wisconsin Dietetic Association, who has been in England since June studying hotel, restaurant, and mass feeding, was to return to the United States late in September.

Helen Sampsel, formerly at Wrigley's Restaurant, will teach restaurant management at the Girls Trade and Technical High School, Milwaukee.

Massachusetts Dietetic Association. The following officers have been elected for 1943–44: president, Opal Bowers, Harvard Graduate School of Business Administration; vice-president and publicity chairman, Geneva Marble, Boston Lying-in Hospital; treasurer, Edith Hoadley, Salem Hospital, Salem; corresponding secretary, Elizabeth Kukst, Harvard Graduate School of Business Administration; recording secretary and membership chairmen, M. Cantoni, Plymouth; program chairman, Marion D. Floyd, Massachusetts General Hospital.

On recommendation of the A.D.A., the Women's Educational and Industrial Union administrative training course period has been reduced to 9 instead of 12 months and a weekly stipend amounting to approximately $150 to $200 for the 9 months' course will be paid to students. In addition, Teachers College, Columbia University, now allows Union graduates 8 points of graduate credit toward the master's degree in institution management upon completion of the course and on the recommendation of the course director. Added to the usual opportunities in restaurant and school cafeterias, hotels, college residence and dining halls, experience will also be provided by the Union in industrial cafeterias of both large and small war industries.

The second meeting of the Subcommittee on Industrial Nutrition, Massachusetts Committee on Public Health, was held in Perkins Hall, Women's Educational and Industrial Union, July 27.

North Carolina Dietetic Association. The *Bulletin* of the association for August reports that two new training centers have been operating in the past year—Charlotte Memorial Hospital and the North Carolina Baptist Hospital, where Margaret Baker and Salome W. Wells, respectively, are directors. In an editorial, members of the state association are urged to work toward establishing a center for training Negro dietitians, since there are many Negro hospital dietary departments where they are needed.

Dietitians who have recently left for Army service are: Margaret Rosenberger, St. Leo's Hospital, Greensboro; Evelyn Gibson, Charlotte Memorial Hospital; Sara Sue Cassell, Woman's College of the University of North Carolina; Helen Eshelman, Hillcrest School, Burlington; and Elizabeth Sherrill, Long's Hospital, Statesville. Recent appointments include: Sally Mooring, City Memorial Hospital, Winston-Salem, to State Hospital, Morganton; French Boyd, State Department of Health, to U. S. Public Health Services, Washington; Annie Lee W. Poteet, Wesley Long Hospital, Greensboro, to her former position at Thompson Memorial Hospital, Lumberton; Edith Hinshaw to Burrus Memorial Hospital, High Point, replacing Hannah Kallam; Helen Strickland, S. and W. Cafeterias, to Greensboro as supervisor of school cafeterias, replacing Cleone Boyd; Helen Mullican, graduate, student training course, New York Hospital, 1943, to Rex Hospital, Raleigh, replacing Pearl T. Peebles, now doing home demonstration work, Statesville; Lelia W. Blalock, to Harnett County Hospital, Dunn; Helen Phillips, Woman's College, to Long's Hospital; Levelle Michael to Sternberger Hospital, Greensboro; Orrea Pye to Woman's College as professor of home economics, replacing Gladys Kinsman. Florence Kitchen has returned to Charlotte Memorial Hospital after completing her training course and receiving the M.A. degree from Texas State College for Women, Denton.

Recent marriages reported in the *Bulletin* were: Lt. Julia Rice to Lt. Robert Lamont Chalmers, Jr., U. S. Army, Brooks Hospital, Ft. Sam Houston; and Stella Ray to Robert Lee Clark, U. S. Army Air Corps.

News From Our Advertisers and Exhibitors. "How Natural Whole-Grain Oatmeal Can Help American Workers, Housewives and Children in This Wartime Food Adjustment Period" is the publication of *The Quaker Oats Company*, Chicago, which answers such questions as "How Does Natural Whole-Grain Oatmeal Fit the Nutritional Requirements for 1943?" From authoritative sources information is offered concerning nutritional deficiencies which must be met, general nutritional value of oatmeal, specific protein requirements and qualitative comparisons, the vitamin B content of various cereals, a listing of iron-rich foods, how oatmeal measures up on the dietary yardstick, and a table offering a comparison of 10 common foods in regard to their protein, vitamin B_1, iron, and calorie content on a penny basis. Recipes are also included for oatmeal cookies and meat substitutes and extenders. This attractive booklet, in the form of charts in black and white and colors, may be obtained upon application to The Quaker Oats Company, 141 W. Jackson Boulevard, Chicago.

During June the *Cereal Institute, Inc.*, Chicago, mailed a questionnaire to newspaper and magazine food editors, food consultants and writers, and radio food broadcasters to discover editorial attitudes and trends in cereal publicity. A total of 1[illegible] replies was received. Some of the interesting findings of this survey were: 51.3% of the newspaper food editors refer to breakfast cereals merely as "cereals." Apparently that term has come to be sufficiently definite as a designation of this particular type of food. The term "whole-grain cereals" seems to be a popular term and to have particular merit. Of all editors reporting, 27.5 think that cereal breakfast foods should be included 4 times a week in breakfast menus; 17.3%, 7 times a week; 14.9%, 3 times a week; and 13.7%, 5 times. All but 11.3% said they had been giving emphasis to more adequate breakfasts recently, while 68.8% said they had been giving emphasis to ingredient use of breakfast foods also, and 50.3% had been giving more emphasis to cereals for other meals in-between meals or evening snacks.

Bread Prices

The ingredients which go into baker's bread in the United States generally are more varied and of higher quality and total cost than those from which the heavier and coarser breads of most other countries are made. The average formula for baker's bread also appears to be richer than that used by most home bakers in the United States, although it might be difficult to convince those who recall the bread which "mother used to make." Some people complain about the quality of present-day baker's bread, believing it to be too light and dry. The bakers, however, seem to believe that the public wants this kind of bread, since the ingredients they use are more expensive than those from which the heavier types of bread could be provided.

A typical baker's bread formula (as computed for 1942) is made up of the following ingredients and costs:

100	lb. flour	$3.08
2	lb. salt	.02
1.75	lb. yeast	.24
3	lb. shortening	.48
4.75	lb. sugar	.26
2.5	lb. milk solids	.36
.5	lb. malt extract	.04
.375	lb. mineral yeast food	.03
64.	lb. water	.00
178.88	lb.	$4.51

This formula yields about 156 lb. bread with an ingredient cost (in 1942) of 2.89 cents per pound. But the cost of the ingredients is only a small part of the total cost of getting the bread to the consumer. Other costs incurred by the baker, including selling and delivery, amount to considerably more than the cost of the ingredients. These additional costs are to a considerable extent a reflection of the many services which have gradually become a part of the merchandising of bread.

In many foreign countries, the bread formulas are much less rich and the aggregate of ingredients therefore is less expensive. Moreover, few of the merchandising services rendered in connection with the marketing of bread in the United States are found in other countries.

It is doubtful that American consumers would turn to breads of the heavier types having as low-cost ingredients as the breads sold in many foreign countries, or give up permanently all of the extra services which have been rendered in connection with the sale of bread in the United States in recent years. The curtailment of services during the war, however, may have holdover effects on the baking industry after wartime controls have been abolished.—*From a technical study by the Bureau of Agricultural Economics, USDA, quoted in The Marketing and Transportation Situation, July 1943.*